NATURE MAGAZINE

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Organized to Stimulate Public Interest in Every Phase of Nature and the Out-of-Doors, and Devoted to the Practical Conservation of the Great Natural Resources of America

The American Nature Association seeks to find for Nature Study an essential place in every School and in every American Home. It is working for Forest and Wild Life Protection along sane, economic lines. It believes that clean, healthful Out-of-Door Recreation is the key to Good Citizenship

IN CONNECTION with the announcement of the Board of Directors relative to the creation of the Julia Pope Memorial Endowment, attention is called to the educational and scientific work of the Association that demands no small measure of the time of its staff. The position of eminence that The American Nature Association has already won in its field brings forth many demands for information, advice and leadership. In the field of Nature Education alone it is constantly increasing its school service and plans further to broaden its efforts during the coming year. In the direction of public education it has notably succeeded in its Outdoor Good Manners Campaign, wild flower and Christmas greens conservation programs, save-the-hawks campaign and other general directions. Its expeditionary activities have been highly successful, and its work with summer camps in the direction of Nature education has been widely appreciated. Many valuable bulletins have been prepared for members and announced in the pages of the magazine, and the scientific information service is one of the busiest in the organization.

All of these activities are expensive both in time and money, but represent only an indication of what the Association proposes to do as a contribution to human welfare as its steady progress continues. Therefore funds donated to the Association for the creation of Endowments are set aside to produce, annually, revenue which will, in part at least, aid in this valuable yet non-revenue-producing work. Endowments range from one thousand dollars up, and under the charter of the Association the principal must remain intact.

Not only are the Endowments set aside in perpetuity but the Life Memberships have been similarly set aside. The income from these is annually devoted to the same work as the endowments. The American Nature Association is particularly proud of its Life Membership list, which includes such names as Mrs. Andrew Carnegie, Capt. John J. Phelps, James M. Roscoe, Miss Alice Robson, Charles Deering, Alfred F. Lichtens, Mrs. Chester C. Bolton, Mrs. F. L. Maytag, Ricardo Pon de Santiago, Thomas A. Edison, Robert Woods Bliss, Philip A. Rollins, Mrs. John Hays Hammond, Jean Webster McKinney, Isabel A. Bross, Mrs. Maud Walker Ames, Mrs. Edward S. Page, Mrs. Frederick Cameron Church, Jr., Williamson Buckman, Mrs. Louis A. Frothingham, Mrs. Charles Eastwick Smith, Miss Meredith Coonley, Mrs. Hennen Jennings, Mrs. Bancroft C. Davis, Mabel Louise Riley, Mrs. William Hewson Baltzell, John H. Hanberg, William J. Rucker, Howard Hutchinson, Mrs. Thomas N. Carter, Mrs. W. L. Harkness, Edwin S. Webster, Ernst Eugene Lehman, Jr., Miss Anna C. McKay, Mrs. Elizabeth C. Marmon, Mrs. Ellen R. Jenkins, Robert A. Young, Mrs. Jay C. Morse, Mrs. Harold Lee Judd, Mrs. John E. Timmerman, Mrs. Francis J. Torrance. Space does not permit publication of the complete list.

THE Board of Directors of the American Nature Association are pleased to announce the creation of the Julia Pope Memorial Endowment presented to the Association by Mrs. Charles T. Miller, Alden Park Manor, Detroit, Michigan, in memory of her sister, Julia Pope. The annual income from this endowment will, in perpetuity, be devoted to the Association's educational and research work.

* * *

Our members have been most highly appreciative of our two lawn articles, one in April and the second in August. We will be pleased to send copies of "Have a Weedless Lawn" to all who request it, and the August article, entitled "Your Lawn", will be available as Bulletin No. 40 by the time this issue is off the press.

TWO of the more recent outstanding articles in Nature Magazine have been "A Plea for our Hawks" and "Our Disappearing Fur-Bearers", both by Edward A. Preble. They are vital conservation documents and, in response to demand, were reprinted, with their color illustrations, in booklet form. A limited number of this small, special run are still available at the cost price of five cents each in lots of not less than ten booklets.

* * *

Outdoor organizations interested in cooperating in the Outdoor Good Manners and Roadside Beautification work may have copies of the special poster prepared for this campaign if they will just ask for it. Mats of cartoons are available for editors on request. Campaigning for the out-of-doors is an all-year task and responsibility.

VAN BOURGONDIEN BROTHERS' BULBS

Tulip Time is Color Time in the May Garden!

PLANT a garden of Tulip bulbs this Fall and let them wake up in a riot of beauty in the Springtime. With the Darwin and Cottage collections offered below you get a wide range of colors with rich, brilliant hues in the large cup Darwins, and softer charm in the graceful Cottage varieties—mostly in pastel shades.

You may have our 1928 bulb catalog on request. The lifelike color illustrations of Tulips and Daffodils and the accurate descriptions of Van Bourgondien Tulips, Daffodils, Hardy Lilies and other bulbs, will assist you in planning and planting your garden.

DARWIN TULIPS

Our Special Suburban Collection

	Doz.	100
Baronne de la Tonnaye. Clear carmine-rose, running to soft pink	$.50	$3.00
Bartigon. Fiery crimson, white base. Very strong grower	.50	3.00
Clara Butt. Clear salmon pink. Most distinct pink of all	.50	3.00
Dream. Beautiful shade of lilac. Gigantic size	.60	4.00
Inglescombe Yellow. Clear golden yellow. In reality a Cottage	.50	3.00
Loveliness. Satin rose. Very dainty and popular	.50	3.00
Massachusetts. Very fine pink, white edge, white base	$.50	$3.00
Pride of Haarlem. Brilliant rose-carmine, most popular	.50	3.00
Raphael. Deep brown. Flower with extraordinary vigor	.70	5.00
Remembrance. Lilac, shaded mauve. Strong grower	.50	3.00
Victoire D'Oliviere. Red; exceptionally fine Tulip in the garden	.70	5.00
Zulu. Blue black. A very distinguished garden Tulip	.50	3.00

SPECIAL OFFER

6 Bulbs each of these 12 named varieties (72 bulbs)	$ 3.00
12 Bulbs each of these 12 named varieties (144 bulbs)	6.00
25 Bulbs each of these 12 named varieties (300 bulbs)	10.00
100 Bulbs each of these 12 named varieties (1200 bulbs)	38.00

COTTAGE TULIPS

Our Special Suburban Collection

	Doz.	100
Gesneriana Lutea. Pale yellow of enormous size	$.50	$3.00
Gesneriana Spathulata. Brilliant scarlet, blue center	.50	3.00
Inglescombe Pink. Soft rose with salmon flush	.55	3.50
Inglescombe Yellow. Like a golden yellow Darwin	.50	3.00
Isabella. Carmine-rose shaded creamy white	.50	3.00
John Ruskin. A blending of apricot, rose and mauve	.60	4.00
La Marveille. Orange-cherry, flushed rose	$.50	$3.00
Moonlight. Pale yellow, extraordinarily beautiful	.70	5.00
Orange King. Bright deep orange	.55	3.50
Picotee (Maiden's Blush) White, heavily margined rose	.55	3.50
Sir Harry. Large lavender pink. Fine shape	.60	4.00
The Fawn. Pale rosy fawn changing to blush rose	.60	4.00

SPECIAL OFFER

6 Bulbs each of these 12 named varieties (72 bulbs)	$ 3.00
12 Bulbs each of these 12 named varieties (144 bulbs)	6.00
25 Bulbs each of these 12 named varieties (300 bulbs)	10.00
100 Bulbs each of these 12 named varieties (1200 bulbs)	40.00

We Guarantee All Our Bulbs Whether Grown in Holland or America.

VAN BOURGONDIEN BROS. BOX A. BABYLON, LONG ISLAND, NEW YORK

BIRD *and* ANIMAL PAINTINGS

by R. Bruce Horsfall

now available in convenient form

Special Limited Edition will be ready on September 1

MANY readers of Nature Magazine have asked when the beautiful color pictures of birds, mammals, and insects that have been appearing in Nature Magazine would be available separate from the Magazine. The demand has been so insistent that this is the result:

A BEAUTIFULLY-BOUND AND PRINTED BOOK CONTAINING 168 PICTURES IN FULL COLORS, THE SIZE OF THOSE ON PAGE 145 OF THIS ISSUE, AND A BEAUTIFUL FRONTISPIECE WILL BE AVAILABLE ON SEPTEMBER FIRST.

Each picture will be accompanied by concise description of the character and habits of the subject.

Helpful suggestions will be included to show the use of the book for school, camp, home and other educational purposes.

DESPITE THE HIGH COST OF COLOR PLATES AND PRINTING ALL THIS WILL COST THE READERS OF NATURE MAGAZINE

ONLY ONE DOLLAR

American Nature Association
1214 Sixteenth Street
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Enclosed please find $.....for.....books of R. Bruce Horsfall *Bird and Animal Paintings* available September 1.

.....

.....

.....

(Please make address complete and legible)

The manager of the Travel Department of Nature Magazine has sent back the following bits of advice from Europe, where a special survey of travel conditions and requirements is being conducted in order the better to advise Nature Magazine readers contemplating travel in England and on the Continent.

WITH fall weather approaching, people who are planning trips for next spring and summer are likely to begin discussing their plans. The tourist going abroad finds many things that are confusing at first because of the difference in the customs of the different countries, so that a few suggestions will not be out of place.

* * *

It seems that steamers are well filled now at any season of the year. This being the case, as soon as one is on board there are two things to be arranged that play a great part in the comfort of the crossing. The first is to see the deck-steward, and obtain a deck chair in a desirable section. The second, is to secure one's tickets for either the first or second sitting in the dining salon. The second sitting (an hour later than the first) is generally preferred.

* * *

Once arrived on the Continent, you desire to write to friends, and are astounded when you go to a so-called "drug" store and are told that they do not sell stamps. It is peculiar to note that stamps can be obtained only in a restaurant, or in a "tabac" (tobacco-shop); also, of course, at the desk in the hotel.

* * *

Another confusing custom is that many of the shops, butcher's, baker's, and smaller clothing stores, remain open on Sunday. In itself that is very convenient, but it is less so when you visit the shop on Monday or Tuesday and find that it is closed all day.

* * *

An American, visiting one of the less important English or French cities, may enter a shop a few minutes before noon to make a purchase. Much to his annoyance, promptly at twelve, the clerks leave and the doors will be locked,—it is time for luncheon! At two o'clock, having lingered in the true Continental manner which is so in contrast with the popular American "counter lunches", the employees of the shop return, and the doors will once more be opened for business.

* * *

Railroad facilities in Europe have been greatly improved in the past ten years. The tickets are divided into first, second and third class, with of course a difference in price. In England the second class carriages are as comfortable and clean as one could desire. But in other countries, particularly for long trips, the first class compartments are

preferable. There is generally a dining car on the through trains and passengers obtain tickets for first, second or third sittings to prevent standing in line. However for those who cannot obtain sittings, or in case of the absence of a dining car, "box-lunches" may be bought for very reasonable prices in the station. These boxes contain sandwiches or bread, cold meats, cheese, fruit, and a bottle of wine and one of mineral water.

* * *

In regard to the buying of mineral water—it is generally conceded that the water in the better parts of Paris is pure. But it is safer in other parts of France to drink "Evian" or "Vichy", the two most popular waters. These can be bought in large or small bottles and are free from any mineral taste. The price varies according to the restaurant or hotel.

* * *

A common source of irritation to Americans abroad is the so-called "central heating". In the smaller cities, even in the best hotels, this consists of heat only in the public rooms. A fire can be laid in your bedroom with much trouble and some expense, but no matter what season you spend abroad it is well to carry some warm clothing for such emergencies.

* * *

For those who are planning motor trips on the Continent we have a few warnings. It is wise never to schedule more than 250 kilometers (about 156 miles) per day. In spite of all assurances one is never certain of the condition of the roads; and, also, one encounters so many fascinating places worthy of investigation that a great part of the joy of the trip is lost if sufficient time is not allowed to inspect them.

* * *

The customs examinations at the borders between European countries are more or less cursory. However, they devote special attention to tobacco, and to the carrying, in or out of the country, of either gold or silver money in any quantity.

* * *

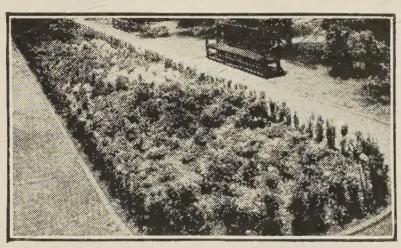
In England and in Switzerland all the cities and villages are immaculately clean, and each house has its individual garden, however small it may be. The entire aspect of the countries is such that one would welcome an excuse to spend an extra day or two in any of the small towns.

Planting Evergreens

Those who have been inspired to try native conifers around their lawns and gardens as a result of C. F. Brockman's article, *Evergreens and the Home,* in this issue, will wish to have the complete and useful additional information contained in F. F. Rockwell's book, *Evergreens*, the latest of his Home Garden Handbooks, which are being published by Macmillan at $1 each. What evergreens to use under certain conditions, how to make them grow in different soils, how to best work them into the landscape plan—all these questions, among others, are answered. It very adequately fills in and covers the ground which the shorter article was unable to do, and should be added to every gardener's library.

Profits in young trees

This corner of a tree garden of Guild Trees was planted last year at a cost of $25. With little care, these trees will be worth $120, four years from now.



You don't have to wait for trees to get tall to be useful. This photograph shows little trees at the entrance to the gardens of Country Life Press. Guild Trees in ensemble make a beautiful effect.

The above photograph shows what can be done with Guild Trees after a few years of growth. The tall growing trees punctuate the dwarf varieties. Several dollars invested now will grow into many dollars worth of trees in four or five years.

NOW is the time to order for fall planting—to get ahead of next year. Your trees will establish their roots during the fall and winter. They will be all ready for big growth in the spring.

Start a little tree nursery at home —it pays!

GUILD Trees are raised in limited quantities under ideal conditions, by the leading foresters of America. That is why they are the premier trees on the market. These trees average much larger than regular transplants at the same ages.

Life of each Guild Tree is Insured

SCIENTIFIC methods of production, packing, and shipping so that they reach you perfectly fresh, enable us to cover every tree with Life Insurance. You take no risk when you plant these trees. **We will replace any Guild Tree that does not thrive.** This offer is good for a year.

Free Instruction in Tree Growing

INSTRUCTION in planting, care, fertilizing is offered free to every planter of Guild Trees. Growing trees is a fascinating pastime—and brings amazing results if you use the best stock. You don't need much ground. A little space 10 ft. x 12 ft. is enough for 120 trees (*see below*).

——————USE THIS FORM OR WRITE US A LETTER——————

To: THE LIVING TREE GUILD, Dept. 69
468 Fourth Avenue, New York, N. Y.

These trees are all transplanted specimens.

Please send the trees I have indicated below, at the proper time for planting this fall. All charges for packing and delivering are included in the prices given below.

If remittance is not enclosed, you may send C. O. D.

	Per Doz.	Per 100
☐ Norway Spruce (5 years old, 10 to 15 in.)	$3.95	$25.
☐ Red Pine (5 years old, 9 to 10 in.)	$3.95	$25.
☐ Scotch Pine (5 years old, 6 to 10 in.)	$3.95	$25.
☐ White Spruce (4 years old, 5 to 10 in.)	$3.95	$25.
☐ Mugho Pine (4 years old, 3 to 6 in.)	$4.50	$30.
☐ Austrian Pine (4 years old, 5 to 8 in.)	$3.95	$25.
☐ Jack Pine (4 years old, 5 to 8 in.)	$3.95	$25.
☐ Colorado Blue Spruce (3 years old, 4 to 6 in.)	$2.75	$20.
☐ Engelmann Spruce (3 years old, 4 to 6 in.)	$2.75	$20.
☐ Arborvitae (white cedar) (3 years old, 3 to 5 in.)	$2.75	$20.

☐ **SPECIAL** FOR STARTING A HOME NURSERY. 120 Trees (Ten varieties—a dozen of each of the above)..... $25.00

Name.....

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Have You Ordered Your Extra California Issues?

One issue of NATURE MAGAZINE *devoted to birds, trees, flowers, gardens, animals, parks, mountains and glorious out-of-doors of California. Articles by David Starr Jordan, Charles Francis Saunders, Elizabeth K. deForest, Wallace Hutchinson, Charles Fitzhugh Talman, Roland Case Ross, Arthur Newton Pack, Harold C. Bryant, A. Brazier Howell, Edward A. Preble, Clinton G. Abbott and others.*

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Washington, D. C.

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Use extra sheet for additional names

How Can I Make a Solution to Intensify Films? Is There a Prepared Solution for this Purpose?—L. F.

There are many different solutions for the intensification of plates and films but for the best results there are none that can beat the mercuric chloride method with the subsequent darkening of the negative. Before placing the negative in this solution it is absolutely essential that every trace of hypo be eliminated by thorough washing. Such negatives as have been allowed to dry should be soaked in water until the film is thoroughly saturated before immersion in the intensifier.

Prepare the solution in the following manner:

Perchloride of mercury . . . . 2 ounces
Hydrochloric acid . . . . . 1 ounce
Water . . . . . 100 ounces

The hydrochloric acid should be placed upon the powdered mercuric chloride and then the water added. The negative, after being thoroughly soaked, is placed in this solution in a tray and gently rocked until it is quite white as seen through the back of the plate. If there are any dark patches the rocking should be continued until these patches entirely disappear. It should then be washed in running water for at least twenty minutes.

To redarken the negative any one of the following solutions may be used:

Sodium sulphite .....1 ounce
Water . . . . . 6 ounces

or

Any of the Hydroquinone developers;

or

Strong liquid ammonia . . . . 1 ounce
Water . . . . . 10 ounces

or

Potassium cyanide . . . . . 1 ounce
Potassium iodide . . . . . 1 ounce
Mercuric chloride . . . . . 1 ounce
Distilled water . . . . . 400 ounces

Another very excellent method of intensification is by the Uranium Intensifier which stains the negative a bright reddish-brown. As with the foregoing, in fact in all methods of intensification this rule should be followed,—the hypo must be thoroughly washed from the negative. After this immerse it in the following solution until it is evenly stained all over:

Potassium ferricyanidè . . . . . 1 ounce
Uranium nitrate . . . . . 1 ounce
Acetic acid, glacial . . . . . 10 ounces
Water . . . . . 100 ounces

When the negative has attained the proper degree of intensification it should be rinsed only in clear water and allowed to dry. Should it be washed for any length of time, especially in running water, the intensification would be largely washed away.

There are several intensifiers in solution form on the market that are more or less reliable. Some one of them may be obtained from any photographic supply house at fairly small cost and, while they answer the

purpose fairly well, it has been my experience that none of them are as good, or as permanent, as either one of the processes which I have described.

Please Give Me Instructions for Making Exposures by Moonlight—L. P. G.

Of course, in moonlight photography, the fastest lenses and plates are necessary in order to cut down the length of exposure as much as possible. With an f 4.5 lens and Eastman's Speedway Plates the exposure, when the moon is full and the sky clear, should range from five to twenty-five minutes according to the amount of shadow in the picture. Of course one can never hope to get detail in the deepest shadows but it is possible, with full exposure, to do so in the lighter ones. If you are intending to do much in the way of moonlight photography I should suggest that you first make several test exposures in order to ascertain the range and capabilities of your lens in this work. If you take as a working basis a fully exposed plate in daylight with the lens wide open and an exposure of 1/50 of a second the exposure necessary under the same conditions by moonlight would be from one hundred thousand to three hundred thousand times as long. We must always take into consideration, however, that there is a tremendous latitude in the exposure made by moonlight, which helps some. When snow is on the ground the light is considerably intensified and therefore the exposures need not be so long by at least one-third. Making the prints on a contrast paper helps to give the full moonlight effect.

"Vanity Kodaks", in colors to match the costume, are the latest decree of fashion.

These are finished in stylish shades and carried in smart cases of the same tint by fashionably dressed women of New York and elsewhere including the various leading women's colleges. They were placed on sale by Eastman Kodak Company on June first in five distinctive shades; red, blue, green, grey and brown.

Incidentally this camera makes excellent pictures 2 1/2 by 1 3/4 inches in size and equipped with the Kodak Anistagmat lens f 6.3, which makes negatives capable of being greatly enlarged, and a shutter with four automatic speeds, 1/10, 1/25, 1/50 and 1/100 of a second beside adjustments for time exposures.

To any of my readers who wish to color their own prints or lantern slides I can heartily recommend the Japanese Water Colors made by the Japanese Water Color Company of Rochester, N. Y. Recently this company has put on the market an entirely new outfit for amateur work consisting of a most convenient case containing twelve half-ounce bottles of the most useful colors. One needs but little or no training in order to use these colors successfully for they are transparent, most easily applied, and self blending. I have been using colors for photographic work for a number of years and can truthfully say that, while I have tried many different makes, I have found none that were better than these. Besides those colors that are sold with the case there are several hundred other shades that can be

GRAFLEX

For the Picture Chances That Are Hard to Get

For the really great picture opportunities of a lifetime . . . pictures you may never have a chance to take again . . . there's just one camera—the finest—the Graflex. Speed up to 1 1000 second. The camera universally depended upon by those to whom the loss of a single picture would be tragic.

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And now there's a Graflex priced within reach of everybody—Graflex "Series B"—3¼"x 4¼"—$80. Other models $85 to $375.

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Wonderful Lecture on Wild Life

Camera Hunting on the Continental Divide

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Thrilling Moving Pictures

by

WILLIAM L. FINLEY

Famous Explorer and Lecturer

who made this remarkable picture on the recent Pack-Finley expedition under the auspices of the American Nature Association, has consented to lecture with it personally during the season

Feb. 15 to May 1, 1929

All who have seen the Finley pictures in the past will agree that this is the best yet

You who have read the story of the expedition, appearing in Nature Magazine for January, February, March, July, and September, 1928, will be more than ever eager to see this picture and hear Mr. Finley.

Rocky Mountain Goats—photographed in the wild from within fifty feet
Beaver—actually photographed in the wild while building a dam
Rocky Mountain Bighorn Sheep
Pronghorn Antelope—photographed from a pursuing automobile at 45 miles an hour
Moose, Elk, Mule Deer, Bears, Marmots

An ideal feature for the winter program of Hunting and Fishing Clubs, City Clubs, Nature Clubs; and absolutely unique as a private entertainment.

SOME of Mr. Finley's engagements include: Boston City Club; American Museum of Natural History; Field Museum of Natural History; Columbia University; Indiana University; Universities of Illinois, Minnesota, California, and Oregon; Camp Fire Clubs of New York and Chicago; City Club of Milwaukee; Westmoreland Club; Worcester Club; Carnegie Institute; Pittsburgh Academy of Science and Art; Detroit Athletic Club; Advertising-Selling League, Omaha, Nebraska; Bruner Bird Club, Lincoln, Nebraska; Philadelphia Academy of Natural Sciences; Women's Clubs of Erie, Pa., Haverhill, Mass., Toledo, Ohio, and St. Louis, Mo.; St. Paul Institute; Women's Literary Union, Portland, Me.; American Game Protective Association; Buffalo Society of Natural Sciences; various Chapters of the Izaak Walton League of America; Public Museum, Milwaukee; various Boy Scout organizations; Edison Club, Chicago; Audubon Societies of Massachusetts, Ohio, and Illinois; National Association of Audubon Societies; Hartford Bird Study Club; Saint Mary's School, Peekskill, New York; University Clubs of Detroit, Buffalo, and Cleveland; Philips Exeter Academy; Bowdoin College; Brook's Club of New Bedford; Toledo Chamber of Commerce; Miss Chapin's School, New York City; The Lawrence School, Long Island, New York.

Dates for the coming season should be arranged as soon as possible by addressing

EXTENSION DEPARTMENT
AMERICAN NATURE ASSOCIATION
15 Boudinot Street, Princeton, New Jersey

bought separately in half-ounce bottles.

Visual education is growing in popularity and two fields lending themselves admirably to it are those of Nature and Science. The motion picture, now coming within the means of many individuals and organizations, is perhaps the most potent factor in visual education. In this connection the DeVry Corporation makes an important announcement of its cooperation in dramatizing the school curriculum of America. Eight film courses have been expertly devised in cooperation with the School Division of the Neighborhood Motion Picture Service of New York. The DeVry Corporation, 1111 Center Street, Chicago, Illinois, will be glad to send information relative to this set of courses.

Home Movies is the name given an attractive publication published by the Gillette Camera Stores, Inc., and designed to help the amateur movie maker. It can be had on request from the company, Park Avenue at 41st Street, New York City.

The first and second prize-winning pictures in our Photographic Contest for July were taken with cameras produced by the Folmer Graflex Corporation. In accordance with the offer of his company, Mr. Harold W. Stimpson, president, mailed checks to both prize winners, doubling the prize awarded by Nature Magazine. Three other pictures given honorable mention in the July Contest were taken with the Graflex.

Albert S. Howell, Chief Engineer of the Bell & Howell Company, was awarded the Wetherill Medal on May 16 by the Franklin Institute in Philadelphia. The Wetherill Award is for outstanding discovery, invention or development in physical science. This distinction was conferred upon Mr. Howell for the development of motion picture cameras and projectors adaptable to the amateur. As chief engineer of the Bell & Howell Company, Mr. Howell has been responsible for the designing of the Filmo cameras and projector—the work which entitled him to this high reward.

No doubt many of our amateur photographer readers are acquainted with the attractive publication of the Eastman Kodak Company, *Kodakery*. Possibly, however, they do not realize that the editor of this publication is always on the market for negatives of good and technically correct pictures made with Kodaks or other cameras of Eastman manufacture. Note that it is negatives and not prints that are purchased. Write to the Editor of Kodakery, Eastman Kodak Company, Rochester, N. Y.

There is an Important Announcement of interest to teachers on page 192 of this issue.

Washington Climbers

Among the energetic groups which rally 'round on skis and snowshoes in the winter time, and struggle up cliffs and down ravines during other times of the year, must be recorded the Washington Alpine Club, whose headquarters are at Seattle. Besides taking an occasional run up Mt. Baker, Mt. Rainier or Mt. Hood, the members of this organization, which has grown since its beginnings in 1916, enjoy social events, support conservation projects, partake of camping trips, and in all ways fulfil their purpose, which is to "encourage the healthful enjoyment of the outdoors of the great Northwest, to preserve its natural beauty, and to promote good-fellowship among lovers of the outdoors".

A Forgotten Race

Only huge piles of kitchen refuse, consisting of thousands of shells, and a few well preserved skeletons mark the passing of the extinct Calusa Indians, who once dominated Florida and grew rich with the shipwrecks of the Conquistadores, according to Henry B. Collins, Jr. who recently headed a Smithsonian Institution expedition to the land of these forgotten savages. Their language is gone, and their customs and beliefs and culture will remain unknown. Only great kitchen middens thirty feet high, and hundreds of feet long, and a few burial mounds, in which skeletons with rings of broken pottery around their heads were found, remain as physical evidence of the life that this powerful race once led.

Gunless Hunting

A better sport than shooting has been discovered by Mrs. Elsie D. Burgan, of Baltimore, Maryland, who offers "gunless hunting" as a worthy substitute for "huntless gunning" when afield. She writes: "One rainy November I was visiting in the country, and my companion on frequent walks was a stray pioneer dog which my hostess had taken in in starving condition. As I walked he used to work around the nearby cover, getting great excitement out of some of the smallest of things. One day, as we were crossing a stubble field, I saw him point—tail out, neck in line with the top of his head. His right paw curved upward. I was admiring his beauty when suddenly a great whir-r-r-r startled me, and a covey of partridges shot up explosively and hurled themselves down the field. The dog looked back reproachfully, as if to say, 'Why didn't you shoot when I found such a nice covey for you?' I was glad, however, for the beauty of the scene, —the pointing dog, the up-shooting birds, —could scarce have been improved, and surely not by a blast of a gun, with the blinding, stifling smoke of the powder."

Caring for Flowers

A plea for better care of annual flowering plants is made to home gardeners by Director C. E. Ladd of the New York State College of Agriculture at Cornell University in Bulletin E 67. He urges careful thinning and deep tillage in sandy loam to fight off cut worms and snails. The season of bloom of annuals may be prolonged, he says, by removing withered blossoms.

Camera-Hunt the Rocky Mountain Goat in **Glacier National Park**

Being a United States game sanctuary, where shooting is prohibited, this million-acre mountain playground affords an unusual opportunity to stalk with a camera many interesting animals.

Great numbers of picturesque Rocky Mountain goats may be glimpsed all along the main ranges through the Park. Here you will also find bighorn sheep, blacktail and whitetail deer, black and grizzly bears. Approximately 1,000 head of elk range through the densely timbered sections of the Park. There's sport aplenty, too, for those who like to tussle with cut-throat trout and other gamy fish.

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THE CABIN IN THE HILLS

NATURE MAGAZINE

PUBLISHED BY

THE AMERICAN NATURE ASSOCIATION

To Stimulate Public Interest in Every Phase of Nature and the Out-of-Doors, and Devoted to the Practical Conservation of the Great Natural Resources of America

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September, 1928

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POLAR BEAR—*Thalarctos maritimus*

ALASKA BROWN BEAR—*Ursus gyas*

GRIZZLY BEAR—*Ursus horribilis*

BLACK BEAR—*Ursus americanus*

SPECTACLED BEAR—*Tremarctos ornatus*

GLACIER BEAR—*Ursus emmonsi*

Some Bear Facts

Or the Story of Six Little Bears

by Carra E. Horsfall

Colorplates by R. Bruce Horsfall

We have all thrilled to the story of Goldilocks and the three bears. We all know bears through the circus, the zoo, or have watched an occasional nomad dance at the end of a chain.

Most of our National Parks and other wooded areas, east and west, still contain black bears and their brown brothers. The two color phases were a puzzle until the fact was established that both cinnamon and black may occur in the same family. Black bears climb easily, hence one may observe them chasing each other up tree trunks or resting upon limbs high over-head. Since they are omnivorous, everything in the way of food is welcome: nuts, fruits and wild honey; small mammals, ants and other insects and their larvae, which they find by turning over rocks and tearing apart rotten logs. Though normally nocturnal, they wander about during the day in regions where they are undisturbed. Winter months are spent in dens of their own digging or some hollow tree or cave, and here the one to four young are born. These are about the size of half-grown kittens, and it is a month before the eyes open, and between two and three months before they are able to follow the mother. Despite unlimited killing in the early days of the settlement of North America, the black bear survived to be still a characteristic feature of our wilder woods from Maine to Mexico.

The fierce grizzly of western North America is rapidly disappearing; some species have become extinct within the last quarter century. However, in protected park areas, a few still come to the feeding dumps at twilight, and in the wilder ranges still persist in stalking and killing cattle to supplement their diet of grubs, rodents, acorns and wild fruit. Their long, rather slender, slightly curved claws serve well in digging the bulbs of glacier lilies, apparently a favorite delicacy, as large torn-up patches are often found. Grizzly bears are intelligent and fearless in combating foes, but gallop off awkwardly if disturbed by an unusual sound. This extreme nervousness has developed since the white man's gun decimated their numbers. They are nocturnal in habit and hibernate during the winter months in a den in the ground or some natural cavern. The one-to-four small, naked young, born in mid-winter, remain with the mother during the summer and hibernate with her the next winter.

The largest bear in the world is the Alaskan brown, found only on the coast and islands of Alaska. Individuals vary much in color and the darker phases might thus be confused with the large grizzlies which share their range. However, they are even more shy than grizzlies and run at the merest scent of humankind. The two can be definitely distinguished by the much shorter, thicker, more strongly curved front claws of the Alaskan brown. Steep mountain slopes or rolling tundras provide good hunting—marmots, ground squirrels, and many mice are dug quickly from their burrows, lowland sedges and fish from the streams are relished in their season. When winter comes these bears seek dry hillside dens where they hibernate until April or May. During this period the two or three young are born.

The circumpolar ice pack is the home of the great white bear of the North, seldom found far from its southern borders unless caught by some sudden unexpected change in its limits. They are tireless swimmers and seldom visit land during the summer, but wander over the ice pack and swim in open water, feeding on seal and young walrus which they kill with a blow of the paw. In winter the female polar bear seeks some sheltered cavern among the snow drifts where one or two young are born. These grow enough to be able to follow her when the ice breaks up in the spring. She cares for them until they are well grown and, when necessary, protects them against harm with her own body. This species of bear inhabits such inaccessible territory that it has been better able than many species to hold its own against man.

The range of the Glacier bear is restricted to a limited area about the Glacier Bay region, northwest to Mt. St. Elias Range and a short distance inland. Its home is literally among the glaciers and its food consists of small mammals which it digs from burrows upon the mountain slopes above and between these glaciers. During the salmon run this bear adds fish to its diet and during the summer he eats berries. Because of the remote and limited region in which it is found, little is known of the life history of this smallest American bear. The hibernation period must be more than half the year due to the long and stormy winter. The glacier bear is considered by some to be a color variation of the black bear—brought about, perhaps, by extreme isolation and unusual environmental conditions.

The spectacled bear is an inhabitant of the dry Pacific coast regions of South America, in Peru and Bolivia. Not much is known of its life history but it lives in the rough and rugged cactus-covered hills where it finds sufficient food for its needs. The peculiar white marking between and over the eyes together with the continuance of the white throat into a line beneath the eyes gives this bear of the South its common name. It is one of the smallest of the bears now known.

NATURE CALENDAR

SEPTEMBER

by E. Laurence Palmer

SEPTEMBER is a month that discourages some Nature lovers. If they have trained themselves to recognize the calls of a few insects they find themselves lost in the insect chorus of the month. If they have learned to recognize a few of the commoner summer birds, they find these birds leaving for other regions and their places being taken by birds that have not been present during the summer. If they have been priding themselves on at last being able to identify a few plants by their leaves they find many of these plants actually shedding their leaves or making preparations to do so. These very conditions might well lead many to cultivate their Nature interests in new manners. They may lead them to look for fundamentals where formerly they looked for detail; to recognize generalities instead of believing that the recognition of specific details is all-satisfying. A good philosophy to read in this connection is that written by Philip Gilbert Hamerton in *The Intellectual Life* to a man of leisure who complained of lack of time.

It is not necessary to be able to recognize all of the birds of a given section of the country to understand that, like the mammals, some are desirable citizens and some are not and that this usefulness may vary at different times of year and at different ages of the individual. The English sparrows that may have won a few friends earlier in the season by feeding their young on insects are now forfeiting their right to our friendship by going in flocks to our fields. The blister beetles which may next year inflict severe injury on beets and potatoes if they are not already doing so may be seeking out masses of eggs laid by grasshoppers. Should they find them they will lay their own eggs among them. From these eggs will develop blister beetle larvae that will feed upon the grasshopper eggs. Thus a creature which as adult may cause easily visible damage to our crops may have inconspicuously in its youth done much to destroy other more serious enemies. Both grasshoppers and blister beetles may be observed laying eggs during the month of September.

September will be one of the months when the grasshoppers and their kin will have come prominently into their own. It might be well to notice how the various kinds confine their activities to particular types of environment; the katydids remain in the trees; the crickets, close to the ground, and other groups limit their activities much to roadsides, deep grassy growths, cultivated grounds or other types of surroundings. Conspicuous among the tribe to which the grasshoppers belong may be seen in September the long awkward "walking sticks" that are rarely seen while climbing about among plants, or the even more absurd praying mantids that attract our attention by their awkward flip-flop flight and their pose of aggression when they come to earth.

Mrs. Comstock, whose birthday, by the way, comes on the first of September, says of the praying mantids that the only prayer they ever make is that more insects may be delivered into their clutches for food. If you never have had the opportunity of watching the operations of a mantis make it a point to attempt to do so this September.

Mrs. Comstock has done many things to make us remember her. Not least among these are her drawings of the moths and butterflies that make such a conspicuous part of the out-of-doors in September. The migrating monarchs may be conspicuous at some time during the month and with them may be the viceroys that so closely resemble them. In some places the green resting stages of the monarchs with their specks of rare gold may be seen swinging beneath a supporting milkweed leaf or some other support. If the moths and butterflies themselves do not hold our interest in early September the caterpillars of a few of the species may be seen hurrying about looking for places where they can retire for a change. Conspicuous among these may be the woolly bear caterpillars whose long hairs protect them from entering the diet of many birds. These hairs, as you may see, prove useful in making the cocoons for the pupal stage, from which will emerge, next spring, the adult tiger moths. We might profitably go on and list the many unique methods adopted by caterpillars for protecting themselves and we might find it worth while to study how other creatures besides caterpillars of moths and butterflies show that they believe in preparedness. Should we do this we would have to include the glaring false eyes to be seen on the caterpillars of the tiger swallowtail butterflies, the protective spray used by the larvae of certain saw-flies, the ferocious appearance of spiders and the repugnant stench of the millipedes.

It may be more to our liking to look in Nature for pleasant things, however. If you wish your imagination to help picture a pleasant place in which to live read "The Valley of Happiness" in *Rasselas* by Samuel Johnson, whose birthday comes in September. Nature forms its text.

AMERICAN ANTELOPE OR PRONGHORN

NATURE MAGAZINE

Volume Twelve
No. Three

September, 1928

BILL FINLEY TURNS NURSEMAID TO A YOUTHFUL BABY ANTELOPE BUCK

BOILED MILK WITH FLOUR MIXED IN PROVED THE BEST EARLY FOOD

RIDING the RIM ROCKS

Clocking the Antelope at Forty-five Miles an Hour

by William L. Finley

Intent upon studying conditions under which live remnants of the great bands of antelope that once roamed the western sage, the Pack-Finley Expedition of the American Nature Association sent a party into the desert country of Oregon in the spring and fall of 1927 to report on the antelope there. Mr. Finley's account of these trips makes a fascinating story which you will want to read and reread.

OREGON—that one word is fraught with the romance of American pioneer history! It brings pictures of covered wagons, hardships, hostile Indians, and—above all—of grim determined faces set toward a land of wealth and fertile soil. It suggests again, perhaps, a modern city of beautiful gardens near the junction of the Columbia and Willamette Rivers, snow-clad mountain peaks bristling with deep green spires of lofty Douglas firs and pines, whose diminishing ranks support the chief industry of a prosperous state. Orchards and truck gardens, tumbling waterfalls—these all make up the picture of what was once an Eldorado and is now, at least in part, a realization of the pioneer's dream.

But in Oregon Nature has two faces,—one of deep luxuriant green and the other of gray. Gray, desert gray, sagebrush gray, endlessly, monotonously stretching in billows of barren landscape. Barren, indeed, in that the ever-courageous followers of the pioneers have but here and there

"BILL" FINLEY GETS HIS SHOT AT ANTELOPE

He captured them on the film, computing their top running speed from the camera footage and the automobile's speedometer

AT THIRTY MILES AN HOUR WE WERE GAINING

Then the antelope settled down to the business of running and the speedometer showed forty-five before we gained on them again. They held even at this speed and were photographed with the camera only twenty feet away from them

ALSO HE CAPTURED A BABY BUCK

After several vain attempts to get a youngster,—fleet even at the tender age of one week,—one was caught and introduced to civilization

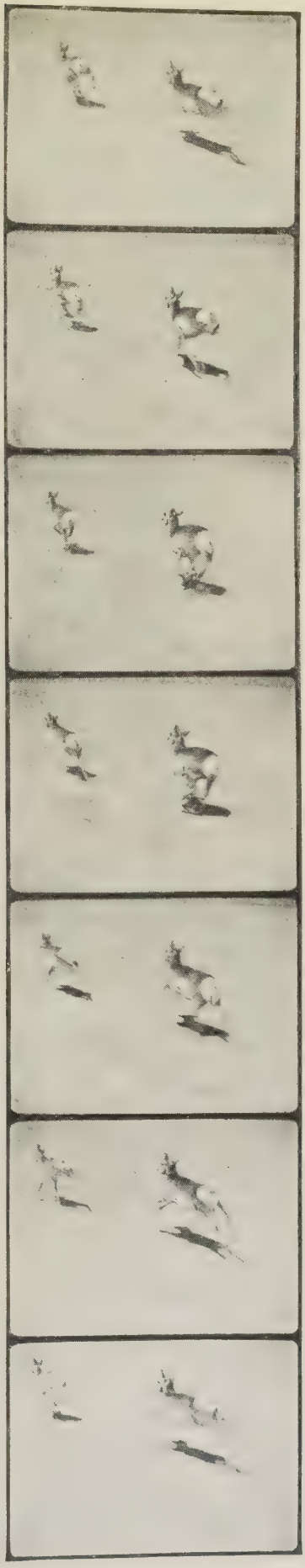
A STUDY IN LEGS

Little Buck travelled to a home on the Willamette where he lives on a luscious man-selected diet and enjoys the run of the place with no coyotes to say him nay

succeeded in eking out a precarious living from the water-hungry sand. This is the country that lies east of the Cascade Mountains, and, bulking vast and empty on the map, comprises the greater part of the state. A splendid highway along the Columbia River bounds it on the north, but in southeastern Oregon but few modern roads have been built and the automobile traveler soon finds his route a mere winding track dodging back and forth between low gray sage bushes.

For two and a half days our car had headed south and east from Portland, and now we were twisting and bumping over rocks through the trackless wilderness of the plateau country. In the heavy rains of the past month the road had very evidently served as a watercourse for impromptu rivers, and the sand had washed away and left sharp jagged rocks to tear the crankcase as we careened over them. Our wheels, left in mid air at one moment, suddenly dropped into a gully at the next. It was spring. We could hear the sage thrashers carolling around us, and Brewer's sparrows sang with the clearness and beauty of a canary. Short-tailed ground squirrels bobbed across the road and a badger careened off into the sage. A mile and a half an hour was our maximum speed,—the ox-teams of the pioneers must have done as well as our modern automobile. Darkness came on when we were still twelve miles short of our expected camping site, and with the darkness came a hail storm. We were about to give up. Suddenly a distant barking came to our ears. It was not the eerie note of a coyote, but joy, oh joy!—the welcome bark of a dog, which told us that we were within reach of a homestead on the slope of the mountain. The homesteader came out and piloted us to his cabin, a rough shack built with quaking aspens and a sod-covered roof notably lacking in waterproof qualities. In fact, the next morning one of our party had to hold a canvas over the stove to keep the rain out of the hot cakes and bacon.

The rain let up after breakfast and we could look out over a vast stretch of sagebrush plateau, a heaving sea as far as the eye could reach. Some twenty miles to the south of us lay the Nevada line. We scanned the country to locate a good lookout where we could lie concealed to watch for antelope. We knew that a mother antelope never ventures far from her fawn but feeds in a circle, keeping guard against any prowling coyote. Then at lunch time she gives a low call and her baby, who has been lying motionless as death in some clump of sage, comes to life and runs towards her. After she has nursed him she wanders along slowly, giving the little one a bit of exercise. Presently the fawn runs off to one side and again drops down out of sight—so still, so perfect in blending with the landscape, so lacking in odor that a coyote might pass within a few feet, unsuspecting of the fine meal close at hand. If there are twins, each may go in a different direction. Our scheme, therefore, was to watch with field glasses, partially concealing our heads with sprigs of sage, and when we saw a baby run off we could mark its location. If the baby was only a few days old we could pick it up easily, for it lies with its head flat on the ground and eyes closed till the last moment; but, if it is a week or so old, it is fleeter of foot than a horse and can not be caught.



We started out in the car, Elmer Williams of the U. S. Biological Survey going along on horseback, and headed south. The horseman rode past a hump in the sand. He passed on, but apparently that hump impressed itself upon his mind, and we saw him turn. Like a flash the hump came to life—a baby antelope about a week old—and made off over the rocks and sage towards a rough lava flow, with the horse following at a gallop. The rider kept up for some distance, when suddenly his horse stumbled and fell headlong, turning completely over and hurling Williams forward on the jagged rocks. He suffered many cuts and bruises and a broken rib, but the antelope escaped. Finally, however, we did find a baby buck about a day old, put him in a sack, and took him back to the cabin. Here we fitted up a well-padded box for him and put him in the back of the car for a three days' journey back to Portland. A bottle and nipple were all in readiness and we gave him a meal of half cow's milk and half water.

The constant bumping and banging over the rocks was rather hard on little Buck, as we promptly named him; but at Bend we bundled him in our coats and took him into a room in the hotel, where he was fed diluted milk and white of egg. By bedtime he seemed

BUCK WAS A GENTLE PLAYMATE

He loved to roam through the corn field, nibbling at the silk from the ears and doing his best to steal a few of the ears themselves. Carrot, beet tops and kale were on his menu, also

OFF THEY WENT OVER THE PLAIN

There is remarkable grace and speed to the fleeing antelope, kings of the shorter distances of running

(Below)

IS THIS PICTURE PROPHETIC?
By a bison skull stands the antelope, member of a great tribe that once roamed our country and is now but few in numbers

A GRUESOME PICTURE, YOU SAY?
Quite not. This baby is very much alive but, between meals, freezes to the ground in successful simulation of death

© CHARLES J. BELDEN

a little rested and slept on his soft bed in the bathroom. We were wakened at daylight by a loud explosive bleat that sounded an alarm through the hotel. Buck was ready for breakfast.

Immediately on our arrival home I offered Buck some warm fresh cow's milk. It did not agree with him. The next time we boiled the milk and that did not seem quite right either, so we added some flour to the milk and that saved the day. For several days the poor little creature felt the effect of his journey, but at last his strength began to come back to him little by little, and our night's sleep was less interrupted by frequent ministrations to see that the baby was warm and not hungry. A few days more out in the sunshine and he was again an active antelope, bounding about on the lawn in the sheer joy of feeling himself well again.

At the age of three months little Buck began to taste some of our garden fare, and to nip the tops of the blossoms from the pink verbenas, the red gladioli, and the white anemones. We did not begrudge them. He was loth to give up his bottle even now and flatly refused to drink out of a saucer. He would go out into the garden to a tree where French prunes were ripening and loll in the shade, picking up the prunes in his mouth as they fell, rolling them around, chewing them thoughtfully, and then daintily spitting out the stones. Then, his appetite satisfied, he would leap into the air in a sidewise twist, his front feet landing and his hind feet swinging off at an angle. Off he would bound like a rubber ball, all four feet hitting the ground at once, and round and round the house he would dash for the sheer love of the wind whistling past him and the earth flying by. If during his runs a strange dog approached on a morning's stroll, his rump patch flared white and his hair stood on end as he pranced off to a place of safety. Then he would spy me on my way to the garden to get some ears of corn for lunch, and nothing could pry him away from my heels. Though carrot and beet tops occasionally allured him, and the kale leaves supplied a variation in his menu, nothing came up to his delight in following me up and down the rows of corn, eating the silk from the end of each ear and trying to steal a nip of the green corn when I was not quick enough to snatch it away.

FLEEING AS THOUGH FOR THEIR LIVES

But the buzzing camera carried no missils of death but sought to carry their picture to thousands who have never seen an antelope

He was free to come and go at will during the day, but when night fell and his milk was ready he would always be waiting at the door. Then he trotted ahead towards the chicken yard, through the first gate, and on to the second one before turning around to wait for his supper. Here, safe from any prowling dogs which might molest him, he curled up in a compact brown ball and was ready for his night's rest.

We wanted to get more pictures of full-grown antelope, so when fall came we headed south again. The antelope would now be running in bands, and the bucks would be challenging each other for the possession of a harem. Our road passed by sagebrush nearly ready to flower and rabbit brush bright yellow with blossoms. An occasional flicker clung to the leaning telephone poles, sparrow hawks darted from fence posts, and pinion jays chattered from junipers nearby.

Jewett, Jacobs and I headed for a dry lake bed flat and white with alkali. In the sagebrush at the edge of the lake we concealed the car as much as possible and lay quietly, watching to see if some antelope might head across the lake and give us an opportunity to take some motion pictures of them at full speed.

Off in the distance, outlined on a point of lava rock against the sky, appeared a small band of antelope. A moment only were their graceful forms silhouetted against the clear blue, then, with a swift bound, two of the does leaped down through the gray sage toward our hiding place, followed closely by a yearling and a big buck. Almost immediately the cause of their precipitate haste appeared in the form of another buck antelope intent on kidnapping the harem of his rival. One of the does tossed her head and swerved as if to join the pursuing buck, but her master headed her off sternly, lowering his sharp horns in angry determination. She obeyed and continued to run on down the slope toward the dry alkaline lake bed which lay like a

white scar across the sage—dry, parched, and bleached by the sun—a mile of flat desert. But the pursuing buck gained on the little band and the leading buck, leaving his harem, turned quickly to meet his antagonist. They clashed with heads down and pushed with might and main, white alkali dust rising from under their pounding hoofs, until they were hidden in a dense cloud. Soon the cloud cleared a little to reveal the newcomer pressing the other buck back, until finally he swept the defeated master back in flight. The victor stood a moment contemplating the flying heels of his rival, then turned toward his newly-won harem and herded them on toward the lake bed. One of the does objected to the change of over-lordship and tried to turn back, but as she ran her new master overtook her and horned her off. She dodged back and forth, bleating like a sheep; but he grunted and puffed and kept her with the band.

Below, partly hidden in the sagebrush, lay our automobile. We crouched beside it and played with chips of obsidian left by Indians who, with their bows and arrows, had crouched among these very rocks years ago, waiting for game. But they had hunted for food and buckskin, while we were out for pictures alone. Luck was with us at last, for the little band of antelope headed straight for the flat and trotted out into the open. I gave the signal and Merle Jacobs jumped into the car and put his foot on the starter. A whir, as the engine started, and—camera in hand—I jumped for the running-board just as the machine bounded forward, cleared the last low-lying sage bushes, and was in full pursuit of the band. The antelope pricked up their ears at the first sound and trotted steadily away, watching us intently. As the car gained, they lengthened their stride; but fortunately for us they headed straight off into the open toward the other side of the flat a mile away. At thirty miles an hour we were gaining. The little herd had forgotten everything and were bending low to increase their speed. "Step on it"! I yelled, as I leaned forward with my camera. A cloud of white alkali rose behind. At forty-five miles an hour we were again gaining on the pronghorns and gradually overtook the slower ones of the herd. The does suddenly veered to the right, but the buck led straight on, his flaring white rump patch a target for which we steered. I held the camera on him at twenty feet, and still he kept even with us. Suddenly the border of the dry lake loomed directly ahead. Frantically, desperately I clung to the car, exercising every faculty to withstand what seemed an inevitable crash. There was a dizzy, wrenching swerve and the pursuing cloud of alkali enveloped the skidding car. A second later I opened my eyes to see the big buck clear the sage with a bound and gallop away to a rise of ground where he stopped and appeared to view our discomfiture with the tolerant amusement of a Marathon winner.

THE SIGN OF ALARM OR SURPRISE

The flaring white rump patch of the antelope reflects the thoughts that he is having

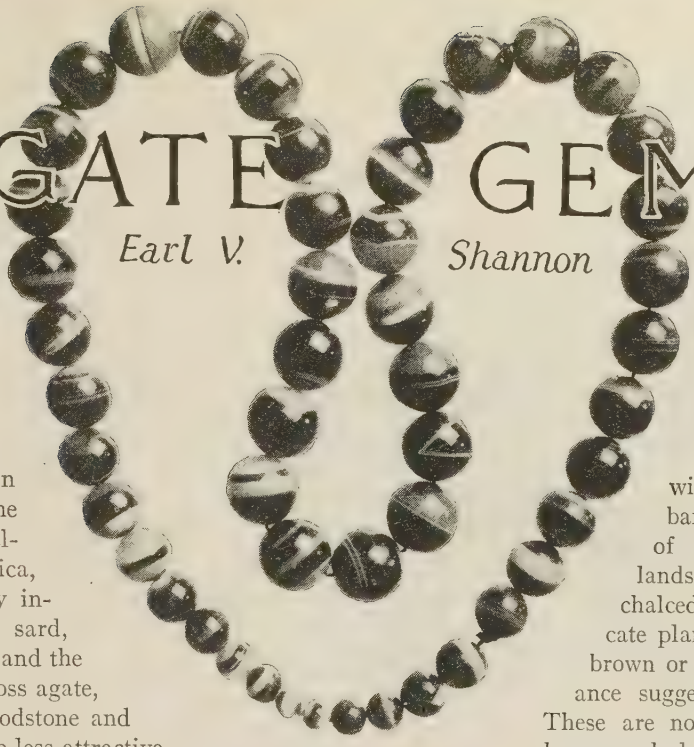
My conscience was pricking me, for wasn't it cruel to run a harmless creature in such a race? The automobile has perhaps been the greatest agent in the destruction of wild game. Shooting in the manner which we adopted for taking motion pictures would be condemned as most thoroughly unsportsmanlike. Nevertheless, the short run across the lake bed, which we had taken, was in no wise comparable with the long chases of African game by automobile, wherein the weaker creatures frequently burst their lungs or otherwise injure themselves in their desire to get away. Our purpose was to discover the speed of the American antelope, and we had done so—first by the speedometer of the car and second by measuring the length of the jumps taken by the buck and determining through the known speed of the film, running over the sprockets of my spring-controlled camera, the number of jumps per second. The rest is a matter of arithmetic.

Some day perhaps Henry Ford will invent a car to negotiate sagebrush without a road, or the low flying airplane will solve the difficulty. I hope not, for the American antelope or pronghorn is today fighting a losing battle against his enemies. Nature has equipped him to match the speed and wiles of the desert coyote, but man—destroying the coyote—substitutes himself as an enemy never provided for in Nature's delicate balance between life and death. The antelope lacks a real sporting chance.

There is nothing more that we can say about the beautiful California issue that will come to you next month. We have announced it and described it several times. It is a number that every reader, wherever he or she lives, should find interesting. No extra numbers of this issue will be printed so orders should be placed in advance on the blank provided in another part of this issue. The California number is one of permanent value.

AGATE GEMS

Earl V. Shannon



AGATE is known prosaically to the mineralogist as chalcedony or chalcedonic silica, —a name which not only includes the esteemed sard, sardonyx, onyx, carnelian and the delicate traceries of the moss agate, but embraces also the bloodstone and the more utilitarian though less attractive flints and jaspers. These stones are made familiar to us, particularly to the boys, early in life through coveting or possessing of a beautifully spherical and accurate-shooting agate or "glassey", or an equally prized arrowhead of flint or jasper. Since the dawn of human culture the mineral chalcedony in one or another of its forms has played an important part. Flint arrow and spear heads, axes, knives and hammers formed the first weapons and tools. Later fire was produced by striking flint with steel, either to warm the hearth or, still later, to ignite the gunpowder of the primitive firearms. Throughout mythology and ancient history there are references to sard, carnelian, and onyx which were among the most esteemed gems of ancient times.

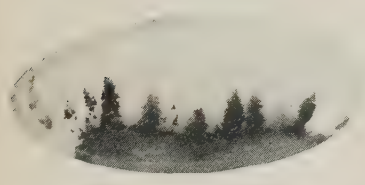
Miner, surveyor, engineer, geologist, pharmacist and chemist is Earl V. Shannon, now assistant curator of Geology at the United States Museum. Born in a little mining town in northern Idaho, deprived of his father by a mine accident four years later, Mr. Shannon has worked his way up to an enviable position in his profession. He has published many research books and papers on mineralogical and related subjects and popular articles on a variety of natural history subjects.

These various stones differ from each other in structure and in the amount, kind and color of their impurities which give them their varying degrees of tint, lustre and translucence. Fundamentally they all consist of chalcedony or silica, which has a very fine fibrous structure visible under the polarizing microscope. In composition they are exactly the same, except for slight impurities, as the sand of the seashore or the crystal ball of the seer. Silicon and oxygen combined form them all.

Agate proper includes the varieties chalcedony, moss and landscape agate, sardonyx, sard, onyx, and carnelian. Of these chalcedony is by far the most common. It is colorless to bluish or gray, often variegated with more opaque whiter bands, and it is the purest of the agates. Moss and landscape agate are bits of chalcedony which contain delicate plant-like figures in black, brown or dark green, in appearance suggesting mosses or ferns. These are not, however, imprisoned and preserved plant growths but are what are known as dendrites and consist of oxides of iron or manganese which penetrated the agate when it was soft and gelatinous. The branching outline is due to a tendency to crystalline growth and the fern-like figures are analogous to the frost figures on a window pane. Oft times the resemblance to landscapes with mountains, clouds, ponds and trees is most remarkable. Many of the most beautiful of these have come in recent years from Montana.

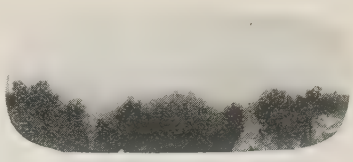
Chrysoprase is a green variety of chalcedony which owes its color to a small content of nickel oxide. Other varieties are colored green by copper. Chalcedony is porous and methods have been developed by which it is colored in various vivid and permanent colors—black of onyx, red of carnelian, yellow of sard and green of chrysoprase. These are often seen for sale in jewelry stores. In addition the banded varieties have bands of more and less porous character and these can be accentuated by dyeing. Thus a dull gray and white banded chalcedony can be stained to make a vivid red and white banded carnelian or a black and white banded onyx. An interesting method of making a false onyx is by soaking a banded chalcedony in dilute honey or sugar syrup. The stone is then placed in hot concentrated sulphuric acid which chars the sugary material in the porous bands, leaving the white bands as they were originally. This dyeing is practiced mostly in Germany.

Sard and carnelian



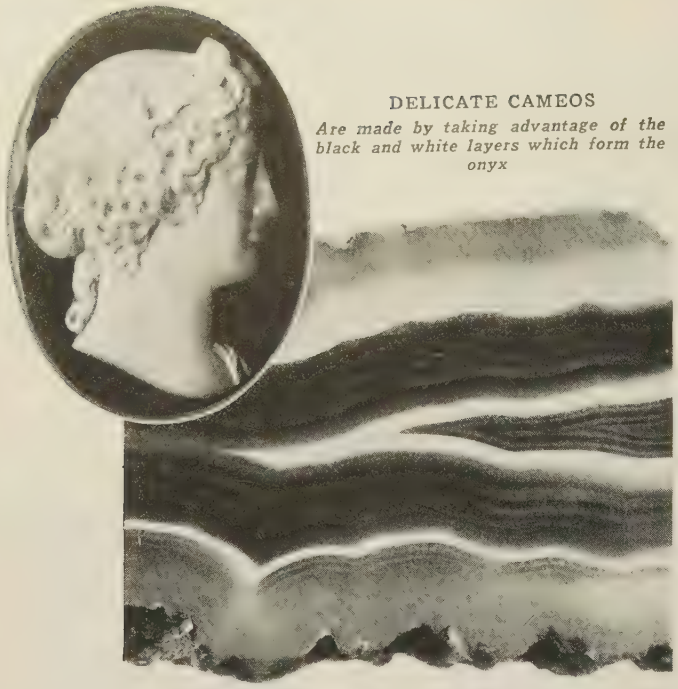
A FOREST SCENE

This is caused by oxides of iron and manganese which penetrate the agate



A FOGGY DAY

Pictured on the chalcedony. These queer works of art are much sought

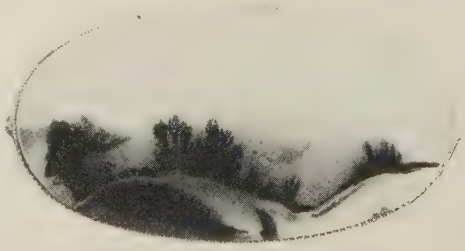


DELICATE CAMEOS

Are made by taking advantage of the black and white layers which form the onyx

include the clear and translucent yellow-to-red agates, the name sard being used generally for the more yellow or brownish kinds while carnelian indicates those of pronounced reddish tint. These stones were highly esteemed in ancient times and many romantic tales have been built around magic seals, rings and scarabs carved from them.

Onyx in its typical form is composed of parallel black and white bands, the black bands probably being colored by organic matter. Good onyx is comparatively rare, hence the practice of artificial coloring. Advantage is taken of the banding in the engraving of cameos, the raised sculpture being cut from the white layer leaving the black layer as a background. More recently black onyx has been in demand for use in the diamond and onyx jewelry which is now fashionable. Sardonyx is a variety consisting of alternating brown or reddish and white layers. The material at present used in soda fountains and on gear shifts of automobiles is not true onyx but is Mexican onyx, a variety of marble.



BEAUTY IN STONE

Brooches are but one kind of ornament which is made from the useful agate

The flints are dull gray or brownish, impure and almost opaque. They have no value for ornamental purposes but have been used by aboriginal people of all lands as weapons and tools. The qualities which recommend flint for this purpose are its toughness, hardness, even texture and capability of being easily worked into sharp-edged forms.

Jasper is essentially vividly colored flint which is usually tinted opaque red or yellow by ocherous iron oxide or hydroxide, or green by an iron silicate. While the red and yellow kinds are occasionally used in barbaric motif jewelry, the only prized variety is bloodstone or heliotrope which has deep red flecks and spots in a dark green ground. Children collect samples for tokens.

Practically all of the agate gems were known to the ancients and under essentially the same names which they bear today. Like other gems they were accredited with many mysterious powers. Their sources of supply were limited and they had considerable intrinsic value. In recent years, however, so many new localities for fine agate gems have been found that almost any of the varieties can be purchased at small cost. Brazil, Uruguay and the western United States are important new sources of supply. Although agates or gems of the agate group are found in a variety of situations the best ones are usually formed in volcanic rocks or lavas. When melted lava is poured out in a liquid flow it often contains gases, particularly steam, which expand into bubbles with the release in pressure. Upon solidification this gives a rock containing rounded cavities. Such a rock is called an amygdaloid lava and the cavities are called amygdules. Ground or percolating water seeping through the rock slowly decomposes it and the silica, passing into solution, filters into the amygdule with the water and deposits on the walls as a thin gelatin-like layer of "silica-gel". Through vast ages this process continues and the succeeding layers may differ from each other in thickness, texture, porosity, and in the amount and kind of included coloring matter. This silica-gel ultimately hardens and becomes agate. The arrangement of the bands offers wide variety. Sometimes the cavity fills solidly with agate, all concentrically banded parallel to the walls. In other examples all but the outermost bands run parallel with the bottom of the cavity. Sometimes the center is left open or again the silica may conclude, for some unknown reason, to crystallize as quartz or rock crystal rather than to deposit as gel in the inner part of the cavity. Often quartz and chalcedony may deposit alternately. In many cases the amygdule is not completely filled with the deposit of silica but remains hollow inside, sometimes with a lining crust of quartz crystals. Such a mass is called a geode.

AN AGATE POCKET

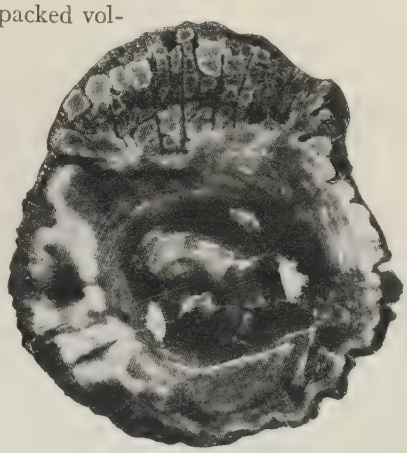
After the layers of onyx, or carnelian, or sard are laid down, sometimes quartz fills in the cavity

Once formed, these agate nodules are extremely hard and resistant to wear and chemical action. As the surrounding rock decomposes and is carried away by erosion they are freed and strewn on the lava slopes or find their way into the stream beds to become water-worn pebbles. Thus are derived the agate pebbles which are so frequently gathered by tourists along streams intersecting the great lava fields of the western United States and on the sea beaches of California and Oregon. The stones are often cut and sold to tourists in western towns as souvenirs. Unfortunately it is sometimes cheaper and more expeditious to obtain South American agates which have been cut in Germany than to send the native stones away for cutting. This is taken advantage of and the writer has purchased, in a New Mexico curio store as a "guaranteed native product" of the region a variety of moss agate known only from India.

A LAVA PRODUCT

Silica was deposited in the air pockets of molten rock, and, through the years, formed agate

"Petrified wood" is in most cases "agatized wood" and is thus a variety of agate. Its formation is similar to the process producing the agate amygdules but it usually occurs in beds of volcanic ash. In past ages vast quantities of fine volcanic dust sifting down like snow have buried forests of upright and fallen trees in dense tightly-packed volcanic ash. Sealed away from the air, the wood has decayed very slowly. Infiltrating waters burdened with their load of silica derived from the surrounding ash have made of each microscopic cell of the wood a tiny amygdule-like series of agate layers. The result is a perfect preservation of the structure of the wood. The ash wears away and leaves the landscape dotted with fallen trunks or upright stumps of forest monarchs transformed to bright colored agate and jasper.



"AGATIZED WOOD"

The original structure of wood buried ages ago by volcanic ash is well preserved

The history of these gems is woven closely with the love of ornament and superstition of primitive peoples. The Sumerians, the earliest inhabitants of Mesopotamia, first used them for cylinder seals, signet rings and beads. Sicily and Egypt, in ancient times, regarded them as capable of healing wounds inflicted by spiders and scorpions, Pliny relates in his *Natural History*. The Magi of Persia used the agates for stopping storms and hurricanes, and changing the course of rivers. One kind made athletes invincible; others helped pearl divers. As ornaments, the stones were used for beads, scarabs, rings and figures by the Persians, and Pliny mentions a beautiful stone possessed by the great Pyrrhus, on which, it was said, Nature had carved the Nine Muses and Apollo holding a lyre.

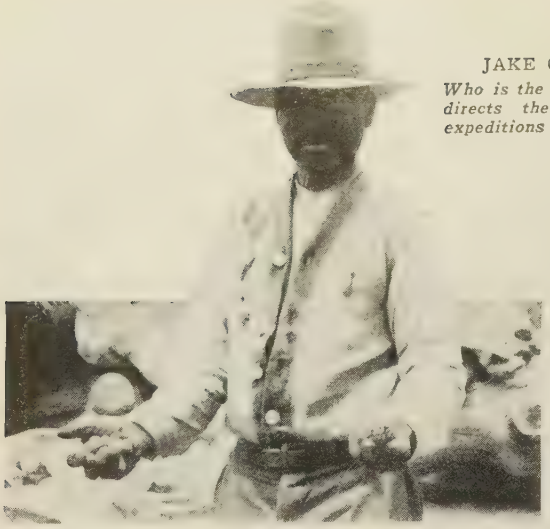
The Oriental nations used these gems for signet or finger rings, getting their best ornaments from the workmen of Limodra, and later from Cambay. The "cat's-eyes", so called, were used for money, in some localities. The art of coloring was crudely practiced on this continent at an early date.

The Mohammedans regarded the stones as marvellous —they would stop the flow of blood, they thought, and increase the supply of human milk during nursing time. China, in the past, held agate next to precious jade in its esteem, and believed that the stones were the transformation of the blood of departed spirits. Agate wine vessels have been found in old tombs, and it is recorded that in 662 A.D. an agate tree, three feet high, was sent by the country Tokhara as a gift to the emperor. Hair pins, fish-hooks, and chessmen have been made from the mineral. More modern has been the snuff bottle and pendant.

Thus has been the past of a semi-precious stone, whose beauty has been dimmed by its abundance, and whose magical powers have faded with the rationalism of modern times. Yet its history has been romantic.

THE WORK OF AGES

Frequently the feathery crystals of quartz alternate with the agate layers, making beautiful creations



JAKE GARRISON
Who is the Piute chief, and directs the food-gathering expeditions of his tribe

Where Pe-ag'gie

by John Miller and
Wallace Hutchinson

THE QUESTION of what to eat and when to eat looms large upon the horizon of anyone who seeks sustenance from the natural resources of a desert region. The wandering tribes of Israel weathered a trying period of hunger during their journey across the wilderness of Sin by feeding upon manna which they obtained by divine guidance. Like the quails that came up and covered their camp at night, this "bread from heaven", which was accepted by the starving multitudes as a miraculous visitation, has been virtually proved to be the natural product of insect life.

But the day of miracles is not yet past—the skeptics to the contrary. Even in these modern times, three thousand five hundred years after Moses led the Israelites forth from Egypt, some of the aborigines of North America look to a kindly Providence to supply their daily food. The Mono and Piute Indians, living east of the Sierra Nevada on the broad sagebrush deserts of Nevada, still patiently await the biennial appearance of a large hairy caterpillar to restock their meagre family larders. This strange custom may be due to an acquired taste brought about by the pinch of hunger in generations past, or it may be but the natural proneness of the Monos and Piutes to eat anything that can be procured with little effort so long as it is tolerably digestible.

The volcanic region lying south of Mono Lake looks about as promising as a base of food supply as the proverbial Mother Hubbard's cupboard. Mark Twain in *Roughing It* gives a vivid picture of the weird beauty of the lake and comments at length upon the "worms" that live in its alkaline waters and the myriads of flies that infest its shores. In one of his philosophic moods he says:

"All things have their use and their part and proper place in Nature's economy: the ducks eat the flies—the flies eat the worms—the Indians eat all three—the wildcats eat the Indians—the white folks eat the wildcats: and thus all things are lovely".

THE PANDORA MOTH
But Pe-ag'gie rarely gets to this stage. The Indians cure it to look like this below

This author seems to have been deeply impressed with the stern necessities imposed upon those who would live in so desolate a country, and it is to be admitted that his observations have, to a considerable degree, been verified. Scientists will tell you that no fish lives in the two hundred square miles of Mono Lake waters, but that a certain fly, *Ephydna hians*, which the Indians name "Koo-cha-bie", breeds in the lake, sometimes in such great numbers that the immature stages coming to the surface resemble islands, and that these "eggs", together with the insects are gathered, dried and otherwise refined for food by the Indians. Science has still further determined that the large hairy caterpillar of this region, which also serves as an important item in the local bill-of-fare, is the larva of *Coloradia pandora*, or the pandora moth. This delicacy the Indians call Pe-ag'gie, and such is the "manna" of the Mono and Piute tribes.

It is upon the foliage of the Jeffrey pine, which grows in the loose pumice of the region between Mono Lake and Casa Diablo Hot Springs, that the caterpillars feed.

D'YE WANT ONE?
Forest Ranger Guy Way samples the new crop. Fine if you don't stop to look

Manna Falls

How the Piute Indians Lessen Danger of *Pandora* Epidemics

They develop from eggs laid by a large, strikingly-colored moth in August of every alternate year. Tiny worms soon hatch from these eggs, bunch together on the pine needles and hibernate through the winter. Early the next spring they exhibit an aggressive appetite, feed voraciously on the needles and soon wax fat. By the first of August they become nearly three inches in length and full grown. At this stage they leave the parent tree by crawling down the trunk and enter the loose soil at the base. Here, several inches below the surface, they form a hard-cased cocoon in which they remain until the following spring. In late June or early July of the second summer the adult moth breaks out of the cocoon and lives through a brief flight period during which the eggs are deposited; and shortly afterwards a new crop of caterpillars comes into being.

The flight years of the Pandora moth and the feeding years of the caterpillars are well established, and so regular are these cycles that the Indians can predict, almost to a day, the date of their next Pe-ag'gie expedition. It is just about the time that the caterpillars mature and start to enter the ground that the Monos and Piutes develop an abnormal interest in entomology. Then follows the gathering of the clans in the localities where the worms abound, and while some of the younger Indians of today seem to be losing their taste for this heaven-sent "manna" there are many older members of the tribes who collect and assimilate Pe-ag'gie with keen, eager enthusiasm.

Forest Ranger Guy Way of the Inyo National Forest, California, is one of the few white men who can give first-hand information on the methods by which the Indians collect, cure and prepare Pe-ag'gie for food. Way accompanied a party of Indians on one of their expeditions and watched the entire caterpillar hunting and curing process—but let him tell his own story:

"It was in August a few years ago", said Ranger Way, "that Jake Garrison, a Piute chief who is a friend of mine, invited me to go with his tribe on a Pe-ag'gie hunt. That was too good a chance to miss, so along I went. An entire *rancheria,* consisting of braves, squaws, dogs and cayuses moved out and established camp on one of their favorite caterpillar grounds. Jake bossed the whole outfit and assigned the areas for collecting to the different families, and believe me, what he said went, too.

TRAPPED!
There's a whole month's ration in this trench. The caterpillars get down in it, and can't get out

"The first thing the Indians did was to dig trenches in the loose pumice soil about a foot deep and from two to three feet wide around the base of all trees eighteen inches and up in diameter. These trenches were placed close to the tree and sloping away from it, with the outer wall as nearly perpendicular as possible. When the caterpillars came down the trunk to enter the soil and pupate they ran into these trenches and gravitated to the bottom—and there they stayed, as they were unable to scale the steep outer wall.

"The Indian women did

most of the caterpillar collecting, scooping them out of the trenches, picking them off the tree trunks where they were plentiful and dropping them into willow baskets shaped like cornucopias. As soon as a basket was filled it was taken to the camp where the curing process was in full swing.

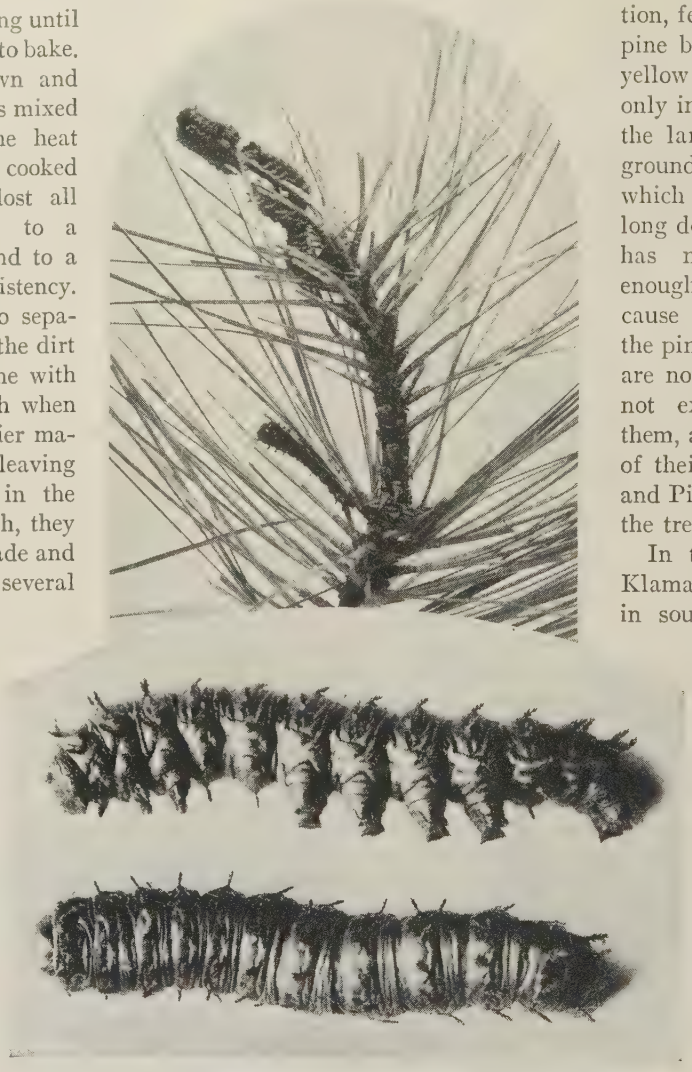
"At the camp, large mounds of earth were heaped up and a fire built around and on top of them and kept going until the earth was hot enough to bake. Then the fire was drawn and the squirming caterpillars mixed with the hot earth. The heat not only killed but also cooked the insects until they lost all their hair and turned to a yellowish-brown color and to a tough but pliable consistency.

"The next step was to separate the Pe-ag'gies from the dirt and ashes. This was done with a sieve-like basket which when shaken allowed the heavier material to sift through, leaving the cooked caterpillars in the sieve. As a finishing touch, they were spread out in the shade and allowed to air-dry for several days.

"The year I was at the caterpillar festivities", continued the ranger, "Jake Garrison and his tribe collected and cured about one and one-half tons of Pe-ag'gies. Later they were packed in sacks and taken to the valley homes of the Indians where they were stored in a cool place until wanted for food.

"Tasted Pe-ag'gie? Sure, I have! They're not half bad—providing you don't think too hard about what you're eating. The Indians use them in stews, mixing them with potatoes well seasoned with salt and pepper, and serving them with bread made from pine nuts and sunflower seed.

"Mono Lake Sam, who was with us on the expedition, said that he had gathered and eaten Pe-ag'gies in that region thirty-five times, from which you can readily figure that he was considerably over seventy years old. Sam, although stone blind, is still considered by his tribe as an authority on the science of properly curing the caterpillars. He told me that some sixty years ago Pe-ag'gies were plentiful on the west as well as on the east side of the Sierra Nevada, and that the Monos, lured by the tempting collecting grounds, had crossed the range and gathered caterpillars from areas that were considered exclusive worming grounds of another tribe. This caused a serious break in diplomatic relations between the two tribes and very nearly resulted in a great Pe-ag'gie war".



PE-AG'GIE—TWO POSES

At work on Jeffrey pine, its staple, and posed for a portrait. Indians soon gobbled it, however

While the art of collecting and curing the caterpillars of *Coloradia pandora* seems only to have been developed by the Indian tribes in the Mono Lake region, the insect itself has a widespread distribution, feeding not only on Jeffrey pine but also on lodgepole and yellow pine. Apparently it thrives only in loose volcanic soil where the larvae can easily enter the ground to form the cocoon in which they remain through the long dormant period. The insect has never become abundant enough around Mono Lake to cause noticeable defoliation of the pine trees. In fact, the larvae are not easily found by anyone not experienced in collecting them, and it is probably because of their scarcity that the Mono and Piute Indians have adopted the trench system of trapping.

In the pumice soils of the Klamath Indian Reservation in southern Oregon, the Pandora moths develop periodically into epidemics which defoliate the pine trees over large areas. Under such conditions they become serious forest pests. Old Indians of the Klamath and Modoc tribes tell of the use of the insects for food in years gone by, but this practice seems now to have almost disappeared. In the terminology of the Klamaths the cocoon stage was known as the "bull-quanch" and it was this stage and not the caterpillar that was eaten. No elaborate method of collecting or curing was used. So far as is known, the Indians simply raked the cocoons out of the soil and ate them uncooked. Collecting must have been a simple matter in the affected areas as it is often possible to uncover half a dozen cocoons in a square foot of soil by simply raking away the top covering of litter.

Perhaps the absence of serious Pandora moth epidemics in the Mono Lake region has been due to the persistent Pe-ag'gie collecting activities of the Indians, who saved the trees by eating the caterpillars. At least, their dietary practices carry Nature economy nearly to perfection, and waste of natural bounties is negligible. As Mark Twain said, "and thus all things are lovely."

A LOVER OF THE TORRENTS
Is the ouzel, who nests near such falls as these

THOMAS J. MALONE

THE BIRD *of* SPRAY *and* WATER

The Diving Thrush Who Nests Near Falls and Rapids

by Frank H. Knowlton

THE AMERICAN robin which hops so confidently, yet with a certain measure of caution, across our lawns, the hermit thrush whose clear, silvery call comes to us from the cool depths of the forest, or the song thrush so dear to English hearts, seem ill-adapted to an aquatic life—and so they are—yet a not distant kinsman of theirs, the dipper or water ouzel, long ago put on a diving suit and taking a "header" from a mossy rock liked it so well that he has been doing it ever since.

The dipper has no particular liking for the quiet waters of lake or slow-moving stream, but chooses for his own the clear, cold, often torrential waters that come down from the higher mountains, and here he may be found at all seasons that the stream is not frozen up. He gives little heed to the presence of ice and snow, as long as there is an open pool, for long centuries of development in such surroundings have given him a constitution that is the personification of hardiness, at least for a thrush.

The American dipper, *Cinclus mexicanus,* is a plump, stocky little bird some six or seven inches in length, reminding one of nothing so much as a gigantic wren, as it nods and bobs at the intruder from a green, slippery rock in the midst of a mountain brook. In coloration it is a slaty lead color, becoming paler below and inclining to sooty-brown on the head. It is found only in the Rocky Mountain region from Alaska to the highlands in Mexico, but it has many and interesting relatives widely scattered in other parts of the world To protect it from the cold waters the body is covered with dense, closely-set

W. L. FINLEY

THE YOUNGSTER
Even the young water ouzels love to dip and dive, and bounce like a cork on foaming waters

feathers, beneath which there is a still further covering of down. The wings are short and rounded and fit closely to the body; the legs and feet are strong, the latter provided with rather long, sharp claws, all admirably in keeping with its habits.

Unlike a duck or other strictly aquatic bird, the dipper does not paddle about on the surface of the water, nor does it use the feet in propelling itself in or through the water, for, with all the changes its mode of life has brought about, its feet are distinctly those of a thrush. In a word it employs only the wings and actually flies through the water, the effort requiring as much or perhaps more energy than is expended in flying in the air. Wading boldly in, usually with the head upstream, until quite submerged, it strikes out with the wings and forces itself downward to the bottom where its sharp claws may assist it in some degree by clinging to chance inequalities; but the wings must be kept in action. The moment they cease, up comes the bird like a cork either to take wing in the air or to permit itself to be swirled and carried for a short distance on the surface of the stream. It can, and on occasion does, force itself into the water by a sort of dive from the surface. It has often been said to walk on the bottom of a stream and was supposed to possess some peculiar powers not enjoyed by other birds, but apparently it cannot do this, for after the manner of all thrushes it is not a "walking" bird, and its seeming to do so is doubtless due to the difficulty of accurate observation in a rapidly flowing stream. Its food, which consists of aquatic insects and their larvae, minute crustaceans and such other small water life as comes to hand, is sought assiduously in all parts of the stream, now along the margins, or along the bottom of the deeper pools, or about some half submerged rock where it is scarcely able to keep a footing,—indeed it occasionally falls in and is borne away by the current before it can recover command of itself.

Though apparently quiet and of good disposition, the dipper is never a very sociable bird, and it is rare to find more than one in a place unless it happens to be a family party of parents and young, and even these parties are soon broken up. By some sort of mutual understanding, in fact or effect, each individual has a certain portion of the stream which it holds for its own and from which it cannot be dislodged without thoroughly alarming it. When one is flushed it flies for a short distance up or down stream as the case may be, and it can be urged to make several such flights, but soon it comes to the end of its chosen or allotted territory, then doubles back to the starting point.

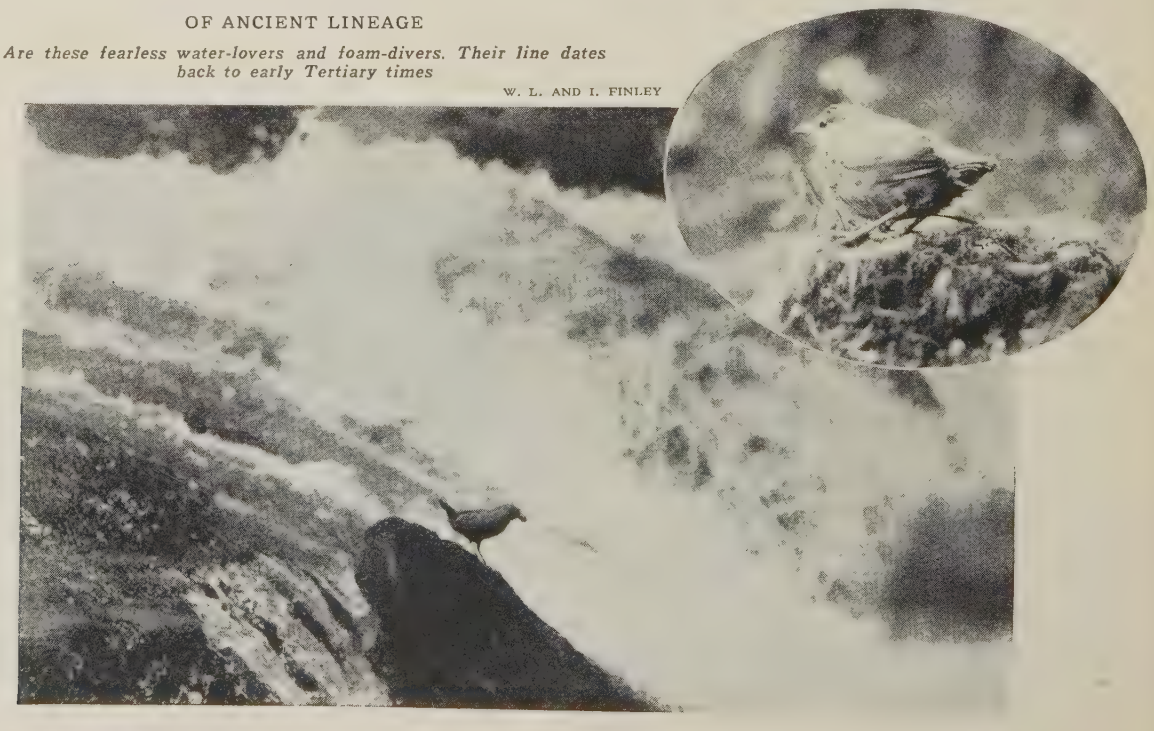
The ordinary note of the dipper it not a very musical production; rather, a low, rattling chatter uttered on the wing when it suddenly takes a notion to visit another part of its domain, or when startled by the approach of a person. But even under the latter conditions the bird does not appear much alarmed and usually stops at a distance of a dozen yards or so and watches with bright interested eyes the next move of the intruder. But for a time before and during the nesting season the dipper fairly lives up to the musical traditions of the thrush family and gives voice to a most exquisite song. Seeking some rocky canyon or deep secluded glen, it gives its real song,—clear, silvery, in perfect harmony with the music of the stream. It is a shy singer, resenting intrusion, and few are the bird lovers who have been so fortunate as to listen to it.

The nest of the dipper, usually made early in the season, is one of the marvels of bird architecture. Selecting a convenient niche in a rocky wall a few feet above a stream, a recess under a projecting bank, or on occasion a rocky shelf behind a cascade through which the bird must fly on each trip to and from the site, the bird constructs a bulky, oven-shaped nest a foot or more in diameter with a round opening on one side. The nest is made almost entirely of closely compacted green mosses and is often so placed that the outside is constantly moistened by dashing spray. If not so provided with running water, the bird sprinkles the nest by dampening its wings and shaking the drops off on the outside of the mossy ball. This is apparently to keep

OF ANCIENT LINEAGE

Are these fearless water-lovers and foam-divers. Their line dates back to early Tertiary times

W. L. AND I. FINLEY



A BIRD MASTERPIECE

The nest of mosses is well hidden and strong, and houses four or five eggs of pure white

W. L. AND I. FINLEY

the moss in a growing condition, and thus, perhaps, render the home less conspicuous. Within, the nest is warmly lined with fine rootlets and softer mosses. The pure white eggs are usually four or five in number. Unfortunately there is comparatively little known regarding the manner in which the young are reared, for the first that is usually seen of them is when they are almost full-fledged. But they are soon initiated into the mysteries of sub-aqueous flight and the search for food, and are able to shift for themselves.

Of very ancient lineage indeed is the family of dippers, with a genealogical tree that reaches so far back into the geological past that they may perhaps lay claim to being among the oldest of any animals now known to inhabit the globe. From facts that have recently come to light it appears more than probable that the dippers had their origin in the great ancient plateau and mountain region to the north of India not far from the beginning of the Tertiary period, a time so remote that it can only be measured in millions of years. Probably even at that time they had assumed essentially the form, size, and habits as we now know them. During the countless ages that have since passed they were undergoing slight color modifications and marvelous distribution. Now the family numbers some thirty distinct members scattered widely over five great continents. When it is recalled that in the strict sense of the word they are non-migratory birds, and never get far away from ice and snow if they can help it, their wonderful distribution is only explainable by recourse to geology, but wherever the avenues have been open, and the conditions congenial, they have gone.

From this ancient cradle of the dippers in central Asia they emigrated north, east and west. One branch, following along the mountain chains which extended northeastward toward the Bering Sea, crossed over the land bridge that then existed between Asia and North America, and found themselves in what we now call Alaska. They continued the journey southward along the great Cordilleran chain, crossed the narrow connecting link between North and South America, and today find their most southern limit near northern Patagonia.

Another branch of the family spread westward from their point of origin, and as the land gradually emerged from the sea, they entered southern Europe by way of Asia Minor. A portion of these turned southwestward and eventually reached the Atlas Mountains in northwestern Africa, whence they sent a side shoot northward across the land bridge spanning the Mediterranean and are now found in Sardinia, Corsica, and the Pyrenees and Alps. Another portion turned more to the northwest and found their way into central Europe, and are perhaps the ancient stock whence came those now inhabiting England and Scandinavia, though there is some doubt as to whether they may not have reached the latter countries by the way of the Pyrenees.

The final branch spread northward over the vast interior of Asia and today one may find them in the Himalaya, the great snow-clad mountains of Tibet, in the different mountain systems bordering the Irkutsk Amphitheatre and Lake Baikal, in the Urals, and along the icy streams flowing into the Arctic Ocean.

It appears probable that before the original dispersal began the dippers had plumage of uniform coloration throughout when adult, but be this as it may, the birds now inhabiting Asia may be divided into two groups which show quite distinct types of coloration. In the one group the adult plumage is dusky throughout, while the young are strongly spotted with white both above and below; in the others some portion of the under parts is pure white in the adults, but the young in this group are spotted in a much less degree. In this spotted or pied appearance of the immature birds lies one of the most important proofs of kinship with the thrushes, in which the young are all spotted. The branch which entered the New World, however, departed from the tradition in this important particular, since so far as known the young do not pass through this spotted or pied stage. The absence of this "thrush mark" in the American forms led to grave differences of opinion as regards their

affinities, but its discovery in their Asiatic cousins, combined with some other peculiarities of the scales on the legs has made valid the claim of thrush relationship.

The New World dippers may also be separated into two groups on the basis of coloration. In the three North American species, which together range from Alaska to Costa Rica, the plumage is more or less uniform grayish throughout, while the four species inhabiting South America have a conspicuous white patch on the under side of the wings, and not infrequently the head also is white. Curiously enough, the dipper which has reached the farthest southern point in the mountains of southern Argentina has developed the brightest colors of any throughout the world. In this bird the throat is chestnut or dull red.

But no matter where found—in the Old World or in the New—from the far-away bleak border of Patagonia, the brawling Rocky Mountain streams, the snowfells of Scandinavia, or the inhospitable districts of central Asia, the dipper is to all intents and purposes the same. With approximately the same size, the same shape, the same voice and the same habits, and only differing in a minor degree in coloration, they stand as a marvelous example of the ceaseless, slow-moving processes of Nature.

HERE HE IS—READY FOR ACTION!

THE CATALPA SPHINX

A Voracious Caterpillar That Strips The Ornamental Catalpa

by A. B. Champlain

TO BE eaten alive is the fate of many of our catalpa trees. Tremendous ravages by the catalpa sphinx —the caterpillars or larvae of one of our sombre hued hawk moths—have stripped their boughs of foliage and left them bare and unsightly. Sometimes the trees die from these severe defoliations, and occasionally entire plantations have been destroyed.

Catalpas may not be a complete success as street or shade trees, but the wood is valuable for fence posts and other purposes. They are esteemed as ornamental in many places, and several varieties are cultivated for this reason. The attractive flowers are showy and conspicuous, and even the honey bees like them.

When the "worms" or caterpillars first come from darkness to light, they are tiny creatures of a pale yellowish-green color. They hatch from the pearly egg-masses that have been laid by the parent moth on the underside of the leaves. About the first thing that they do is to eat a hearty meal, and for some time this problem of dining will claim most of their attention. Being somewhat timid and lonesome at first, they work together in rows or clusters upon the leaf, stripping it.

Soon, however, their taste for this epidermal delicacy and the considerable amount of leaf-tissue required to keep them full and contented interfere with this arrangement, and they separate. With improved digestion,—having grown rapidly—they eat the whole leaf, and it is a lamentable fact that the foliage of the whole tree they are born on will be required to support them through their caterpillar or larval existence.

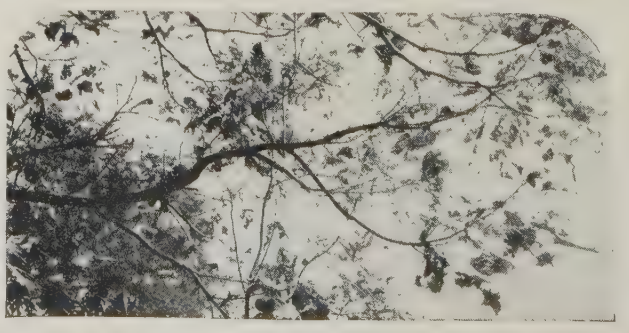
When full grown, the caterpillars resemble somewhat the familiar tomato or tobacco horn-worms. They are about three inches in length and have a cylindrical body, with the posterior extremity ornamented with a curved horn or spine. This horn is not a stinging organ, and the caterpillars are harmless in this respect. At this time they are dark green or yellow, with pronounced black markings or bands extending the full length of the body.

Having eaten their fill of catalpa leaves, they are now ready to descend from the tree and enter the ground. Here they hide themselves under the surface of the earth, forming a cell in which they transform to the pupal stage. This pupal or chrysalis stage lasts all winter in the second generation.

The moths that emerge from these reddish-brown pupae are of the regular hawk-moth type. Their wings are strong, and the body pointed, while the general color is a dusky ash-gray. Strong in flight, they will soon fly to the catalpa trees, where the females will deposit the egg-masses from which the catalpa sphinx caterpillars will emerge.

STRIPPED!

The larvae of the sombre hawk moths grow fat on the leaves they destroy



Among the remedies suggested, in addition to arsenical sprays which will easily control these voracious feeders, is that of collecting and destroying the egg-masses or the little clusters of caterpillars after hatching. Deep plowing will also destroy them in the pupal stage.

Like the RHINOCEROS, Walk Alone

And the Wise Man Lets Him Do So

by Stephen Haweis

Illustrated by the Author

THE AUTHOR of *The Bad Child's Book of Beasts* wrote a verse celebrating the thickness of this pachyderm's hide:

"I go to shoot rhinoceros
With bullets made of platinum,
Because, if I use leaden ones,
His hide is sure to flatten 'em"!

And though platinum would serve no better than lead, it is true that the rhinoceros's skin is so thick that until the invention of the new high-power rifles, it was practically safe from the sportsman's gun. Strips of rhinoceros hide, when dry, can be made into walking sticks which look very like horn.

Like all insensitive, thick-skinned people the rhinoceros is very stupid, and his conversation, if he had any, would be loud statements of facts which everybody knows, delivered with the air of handing out original thought through extreme good-nature. How stupid he is! But it is lucky for us that he is so, for if the rhinoceros had the intelligence of the elephant, Africa might long ago have ceased to be a place where human beings could live: it might be a Rhino Republic in which every citizen was President and army combined. The rhinoceros is no household pet; it charges with intent to kill on the slightest provocation. The buffalo, unlike the common bull, charges with its head up and its eyes open, looking for its enemy. An elephant will not only search for one who has done it an injury but will remember for long after any other animal would have forgotten, and is quite capable of revenging himself after many years. The rhinoceros however sees very little out of its piggy eyes and depends for its safety more on its sense of smell than its vision. It charges with its head down and the huge horns forward in the direction of the smell, and if the hunter happens to be the smell and cannot speedily aerate himself or go away from there, his is a hard case.

Head on there is almost no place to shoot a rhinoceros without making him laugh. The bullet will glance off the thick, nobbly head as readily as from the horns on his nose. Five thousand pounds of unintelligent ferocity galloping towards you almost as fast as a horse can go is a matter for quick thinking and decisive action. It might well be described as a predicament. If you can jump quickly to one side, it is more than possible that the rhino will charge past you without noticing that you have moved. He may even continue for a couple of miles at the top of his speed unless he happens to hit something. If at the end of his charge he still remembers what it was that got on his nerves,—his olfactory or nose-nerves, to be exact,—he may possibly put his head down and charge just as hard in some other direction from which he catches a whiff of oppoponax or tobacco smoke, or anything else his sensitive nose disapproves of. Whatever sensibility he has is in his nose. . . there are people like that! But generally he forgets and is consequently far less dangerous than an enraged buffalo or elephant, or even the pachydermatous human being who always seems to be able to scent something disagreeable and is never weary of charging, head down and blind, horning in. . . and keeping at it. Aren't they terrible?

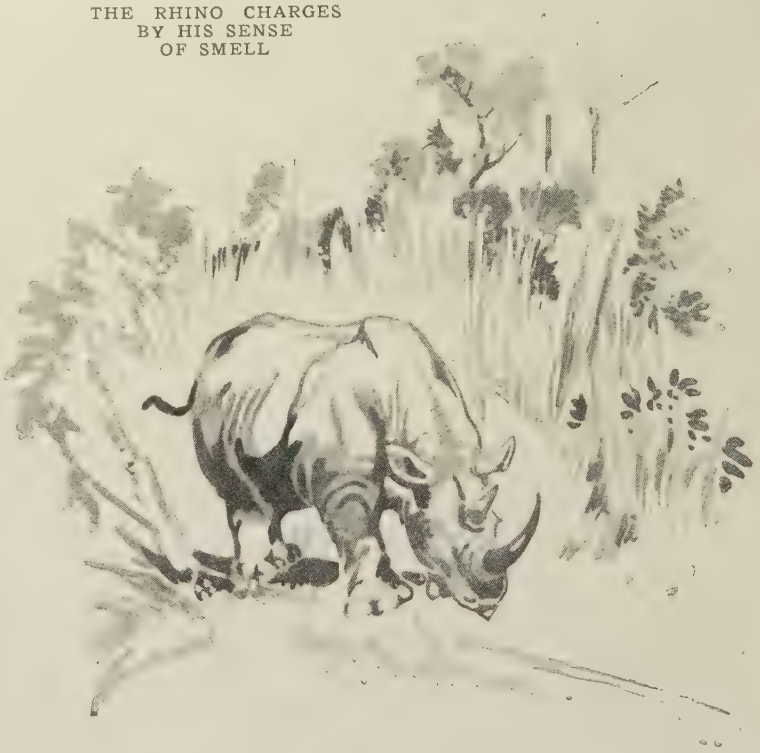
The African rhinoceros has two horns while the Indian variety has only one. There are plenty of them still free and ramping about in the wild but it is not easy to catch them alive. They have been often seen from the railway which runs from Dar es Salaam to Lake Tanganyika and occasionally a rhinoceros has charged an engine, thinking it a dangerous creature which ought not to be left at large. Parties of our expedition were charged by rhinos on several occasions but without damage. We were trying to catch a young one, but those we saw were all either too young or too old. If you catch them too young they always die, and if you try to catch those which are too old, you generally die yourself, unless you have great luck. The Wagogo have a proverb: "Who would insult the rhinoceros, has found a tree to climb". And who should know better than they? Pa and Ma Rhino do not part

THIS is the last article in the series based on the Smithsonian-Chrysler Expedition to Africa in the interests of the National Zoological Park. We have received many comments from our readers on this group of articles and on the manner in which Mr. Haweis has presented them. They have been more than just stories and have sought to leave a thought with the reader. There will be more from the pen of the versatile Mr. Haweis.

with their children any more willingly than human parents would, and when one must kill the parent to obtain the young, a decent hunter thinks a long time before he fires, lest he should do unnecessary murder. The difficulty and danger of capture and transport makes the rhinoceros a costly animal to buy. It is worth a thousand dollars on the soil, and the expense of bringing so huge and refractory an animal by train and ship for thousands of miles builds up his last price to a very great sum indeed. Capture is always a matter of luck. You may find one under fortuitous circumstances in a week or you may miss them for a year and never come within a mile of an animal suitable for transport.

Hunters always tell of the stupidity and ferocity of the rhinoceros, but the ancient Hindoo philosophers saw in them a very different story. To them the rhinoceros symbolised strength and bravery and independence. It is certainly true that the rhinoceros fears nothing and turns aside for no creature, not even man, so there is some point in that one of the ancient Vedas which repeats after each stanza: "Like the rhinoceros, walk alone"! The rhinoceros makes his own path and does not follow anybody's lead. Those who follow his example in that are the great people of the world. The moral is good as far as it goes, but a quibbler can always answer unanswerably, "That is because the rhinoceros is so foolish that it has not the sense to follow a lead, even when it is a good one".

THE RHINO CHARGES BY HIS SENSE OF SMELL

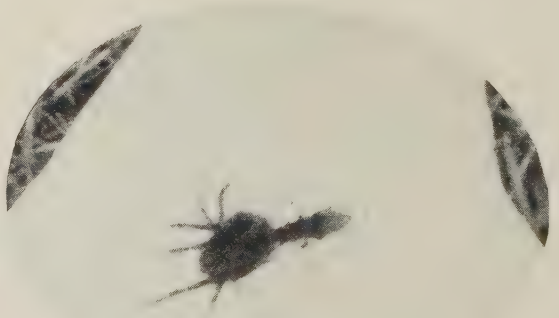


Well, there it is, . . the moral doesn't work out quite as it should, but if you look hard enough and worry a moral till its backbone rattles, you will often find that it isn't really as good as it sounds at first. The human pachyderms are always quoting morals, because their eyes are too small to see the catch, their minds too mean to admit they are not always right. Our best hope is that they should some day read the Vedas and learn to resemble the rhinoceros and walk, . . severely. . alone! Then we can the better respect and admire them.

Spider Hunting

A Wasp Brings Meat For Her Young

by Theodore Grefe Mehlin



THE LONG TREK
It is no easy thing to drag a heavy spider more than forty feet to your home

LOWFLYING goes the female wasp, hunting, hunting. She feels the urge of motherhood—she is searching for food for her young. Swiftly she swoops, and an unsuspecting spider feels her hypodermic needle and slowly paralyzes, though still alive, while the fond mother grasps it in her feet and drags it to the home. Perhaps the home is forty feet away,—as it was in the case of this wasp; perhaps she has to drag it with its great weight up the perpendicular face of a rock more than six inches high. Yet she does it all with a will, and once in the hole, she deposits a wasp egg on its body. As the spider remains alive, the grub which hatches will be sure to have fresh meat. A cruel, barbaric practice, —but then, living is no Sunday School picnic. Even man has been known to torture man, for less than food. And the paralyzed spider hardly knows he is a victim.

WESTERN RED CEDAR
It gives rugged, natural beauty to a country home

EVERGREENS FOR YOUR HOME

Using Native Conifers in the Landscape Plan

by C. Frank Brockman

ALONG the rugged twisting shore of Long Island, there is a large beautiful home of unusual architectural grace, with thick flowering gardens surrounding it, with smooth, close-cropped expanses of lawn stretching away from it down to the water's edge. Yet it looks barren and lonesome on its hill. For around it, there are no trees.

Trees change a house. They make it a home, they give it a naturalness, a softness which it needs; they form the frame to the picture. And while poplars and maples and beeches have long been used by Americans to keep still living a touch of the America carved from the forest, yet the native conifers, in late years, have been neglected, and their special type of beauty,—that of the evergreen,—overlooked.

In this day and age of natural effects the native conifers are particularly desirable. They impart a fragrant touch of the open woodlands to the home grounds. Their rugged outlines relieve the tenseness which many of our ornamental species seem to embody. True, we may err in using them to too great an extent. These species, as a general rule, are not of such a nature as to permit promiscuous planting; rather they should be used sparingly to furnish a spicy touch, to add a bit of paprika, as it were, to each vista. Handled as individuals or in small groups, however, the effect will be most pleasing.

ERNEST CRANDALL

WITH THE FLOWERS
The ornamental arborvitae group lends itself to borders and gardens

Yet in the use of conifers the old adage, "familiarity breeds contempt",—seems to hold good. We invariably look, it seems, to distant pastures for those ornamental species which will impart a degree of informal ease and natural beauty to the exterior of our homes. We overlook, in most cases, those varieties which are close at hand and fail to perceive their latent beauty and the possibilities which they offer as landscape plants.

In the Pacific Northwest, noted for its abundant coniferous growth, the species native to that region occupy a very minor role in the beautification of the homes there. The varieties of conifers used are almost wholly from the East or the Orient. On the other hand, in the East the Douglas fir, which is so ruthlessly ignored by the people of the Northwest, is described as "one of the most beautiful and distinctive conifers extensively used for landscape planting", and the alpine fir, *Abies lasiocarpa,* can pose as "the most beautiful and symmetrical of the conifers".

FOR CORNERS
Tall varieties, such as these Port Lawson cypresses, make striking flanks for base planting

This condition is reflected throughout the different localities within our borders. We apparently find those qualities which we desire in ornamental varieties native to distant parts, yet if we would but look about us we may discover those same potentialities included in our own coniferous growth. While our whimsical fancy has resulted in a wide dissemination of nursery stock, it has failed to produce in our planting, as far as conifers are concerned, a semblance of the natural forest cover which we invariably admire so much in the native setting.

The pines, when properly handled, add a sense of rugged stability to the landscape. Because of their burly, irregular character they are essentially species which are more readily adapted to a large area but even on the small city lot they may be used to advantage. Their tall, cylindrical, unbranched trunks hold aloft the sparse, open crown allowing the radiant sunshine to filter through to the ground and thus permitting a lawn of perfect continuity. Tall pines appear to advantage to the rear and to one side of the small lot or as an artistic natural grouping of more pretentious dimensions when the size of the estate will permit. Their somber, irregular outlines add a breath of the open spaces to the urban landscape. Perhaps they are not more generally used because of the fact that they are most charming when fully matured. To the average person this usually means that the pines must already be established on the area before the actual construction of the home is begun and obviously this is not the case except in a few regions. However, small trees of this variety are especially desirable for use where there is a vista in the background which we do not wish to hide and yet where the natural contour of the land or the arrangement of the plan calls for some sort of shrubbery.

In the pine group we have many species which may be used in landscape architecture. The East and the Lake States may use the splendid eastern white pine or the more rugged red pine. The South has its celebrated hard pines,—the loblolly, long leaf and short leaf as well as the Cuban,—all of which may be effectively blended into the landscape. As we move farther west we become aware of the possibilities which are possessed in the western white pine, the western yellow pine and the gnarled limber pine. These are the chief varieties which, with proper handling, produce the best results in those sections where they are found naturally. Their fadeless foliage adds a fragrant "woodsy" touch which everyone can appreciate.

GRACEFUL GROUPINGS
Even the Douglas fir, used to cliff and mountain, fits well into the landscape scheme

As a group there are no more beautiful trees than the firs. Their symmetrical, spire-like forms are a distinct addition to any landscape, and they form especially pleasing combinations with their near relatives—the Douglas firs, hemlocks and spruces. Many varieties of these groups are at present being cultivated for landscape purposes, a tribute to their excellent qualities.

One can hardly deny the radiant beauty of the Colorado blue spruce, and the part it plays in the beautification of our homes is very distinctive. Its particular charm is especially noticeable when placed apart from other varieties or where its verdant beauty is contrasted with the bold outlines of an artistic bird path or concrete lawn bench. Its beauty is individual and consequently it must be handled individually in the plan. One loses the effect thus created if it is mingled with other conifers. This tree, as its name implies, is a native of Colorado and the botanical range extends into the Wasatch Range of eastern Utah, but nurserymen have been quick to capitalize its good qualities

and it is now being propagated in practically every nursery of the country on a commercial scale.

The spruces, Douglas firs, hemlocks, and cedars are fairly tolerant of shade and thus are well adapted to small, compact groupings. In this respect they are probably best suited to the small city lot, or, in the larger area, to small artistic groupings in connection with some feature such as a lily pond or fountain. In the latter setting their restful contours are mirrored in the quiet waters, enhancing the beauty of such a spot to advantage.

ERNEST CRANDALL

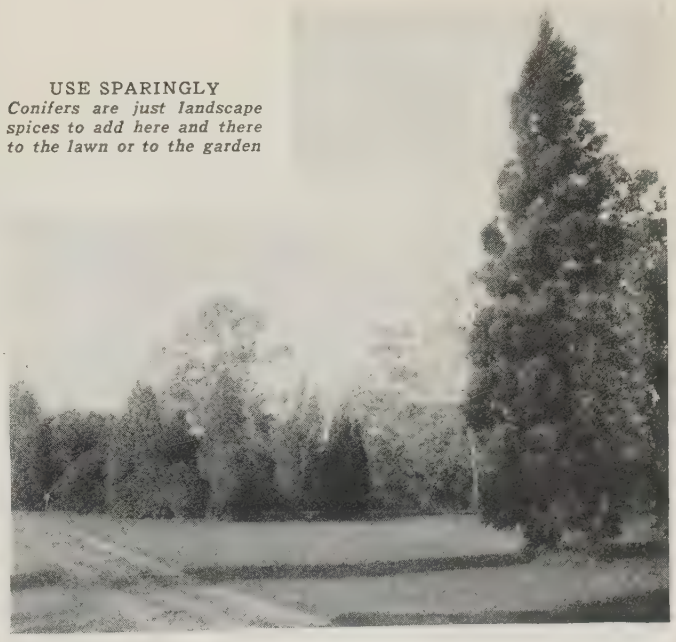
NATIVE BEAUTIES
Why send for distant varieties, when those at home have just as much to offer?

The red spruce and the white spruce are found growing in abundance in the northeastern states and in that locality may be regarded as the representatives of the spruce group in our native coniferous landscape. The forests of the Rocky Mountain states contribute two very important species to the homes of that section—the brilliant Colorado blue spruce and the less known but no less beautiful Engelmann spruce, while in the Pacific Coast regions are found two representatives of this family,—the Sitka and the weeping spruce. The Engelmann Spruce, whose extensive range embraces the Coast region, also is found here. These trees, all of which are of importance in the lumber industry, are also suited for landscape work. In fact they are used extensively in places where they are not as well known as in their native habitat. Their beauty is very distinctive and is greatly admired in the woods. The Norway spruce, now grown in this country and available from nurseries, is a remarkably popular addition to the evergreen landscape plan.

The true firs are an extensive group and like the others are represented by one or two species in practically every section. The balsam firs are both beautiful and aromatic—a combination not found in any other ornamental variety—and may be successfully used by the people of the Northeast. There are two species commonly called balsam firs; the true balsam, *Abies balsamea,* and the Fraser fir, *Abies fraseri.* The former grows chiefly in Canada from Labrador westward almost to Alaska, touching the United States from Michigan eastward to Maine and south along the Appalachians to West Virginia. The Fraser fir is limited to that section along the higher peaks of the southern Appalachians. The most symmetrical and beautifully formed tree, the alpine fir, is found in the Rocky Mountain region where its trim, spire-like crown adds beauty to the most rugged and foreboding of the rocky steeps. Its nearest relative in that part of the country is the white fir which, although not quite as picturesque as the former, is also well adapted to landscape planting. The Pacific Coast forests are particularly well supplied with trees of this genus and the people of that section will lose much that is beautiful in Nature if they fail to include some one of the seven species found here in the landscape design. These seven species are the grand fir, bristle cone fir, noble fir, magnificent fir, stinking fir and the two Rocky Mountain species, the alpine fir and white fir. They are trees of fast growth, of dense compact foliage and wonderfully symmetrical long crowns, these qualities being very desirable in landscape architecture.

The hemlocks resemble the true firs to quite an extent, except that they are not as symmetrical and have more open foliage than the others. A unique and beautiful feature is the drooping character of the long branches. The hemlocks and their near relatives, the Douglas firs, closely resemble the true firs and may be used with them in mixture very effectively. The hemlocks are usually slow growing. Four species are found in this country—two growing in the East along the Appalachian Range and two growing along the Pacific Coast, particularly in the Northwest.

The most extensively grown of the native conifers



USE SPARINGLY
Conifers are just landscape spices to add here and there to the lawn or to the garden

for landscape purposes is that group commonly known as the cedars. This comprises five genera of different character but their foliage is remarkably similar, being scale-like and soft to the touch. The five genera mentioned include eight varieties suitable for landscape purposes.

The incense cedar is a "native son" of California. It is best suited to landscaping if handled in much the same manner as the pines,—singly or in natural groupings. The *arborvitae* group comprises a great many of our ornamental varieties. The home of this genus is in the Orient although several species are native to the United States as well. The oriental varieties are extensively propagated by nurserymen and so the Orient can be credited with many of the beautiful American homes. In northeastern America we find the white cedar. It is found in the Appalachian region and west as far as Minnesota along the northern border of our country. The most common of the third genus in the cedar group is the Arizona cypress, which is a native to our Southwest. It has much the same form as the celebrated Italian cypress, except that it is slightly bushy. The crown is very narrow, with dense compact foliage and it is very hardy, making it excellent for use on corners and where the height of a particular line is to be emphasized.

The junipers, also of the cedar group, are well known and extensively used. The trailing variety is extensively used in rock gardens or where a low growing species is desired. The trailing juniper, *Juniperus communis,* is the most widely distributed "tree" in the world, inhabiting the greater part of the entire northern hemisphere so that practically everyone in the United States and Canada may utilize it when the occasion demands. The junipers are for the most part dwarf trees with a characteristic bushy, scraggly form.

Our native evergreens,—or rather conifers,—possess latent beauty which expresses the spirit of the woodlands. They are well suited to the perfection of an individual feature such as a native flower garden. Here the picturesque charm of the wild flowers is enhanced by the verdant beauty of the conifers. The natural setting is reminiscent of the true woodland charm. In our native conifers we will find practically every feature for which we customarily seek in species from distant regions. There are the tall, rugged, open crowned pines which appear to advantage individually or in sparse groupings of their own kind, the spruces, firs, hemlocks and "cedars" which seem to impart greater beauty when they reënforce each other in dense clusters, which are particularly pleasing as corner groupings, entrance and even base plantings. Then as if to prove to us that their possibilities are far from exhausted we discover the trailing juniper which may be used wherever a low habitat is desired—in low corner groupings, borders or in artistic drapings over the rocks in the rock garden. The many species which the family Coniferae includes are found widely scattered and in no one locality can all these features be taken advantage of naturally. Yet the natural woodlands of each region have their particular charm which may be embodied in the landscape development of the homes there easily, effectively and economically.

A Deer Goes A-Visiting

Mother and Fawn Become Members of Boys' Camp

by Colin S. Farmer

I WAS RESTING quietly during the afternoon siesta when one of the boys at Camp Ahmek, in Algonquin Park, Ontario, burst into the tent with eyes as big as saucers. "S-s-s-say!" He spluttered, "There's a doe and a young fawn lying down upon the hazels just back of one of the tents. Come on quick." I knew that deer were plentiful in the park, and that their enemies, the wolves, were just as abundant and keen for meat, but I never expected that a white-tail would come so close to humans. It didn't take long to limber up the old camera, and follow the eager, excited youth to the resting place of his brown-colored find.

It was siesta time for the deer, too, we found. The doe was lying down in the shade of thick shrubs, while the fawn stretched out lazily some twenty yards away. We manoeuvred for a shot at the fawn, who was less shaded. He didn't mind us, but the glassy eye of the camera was a voodoo to him, and he rose after the shutter snapped, and went over to his mother for consultation. Very obligingly, she got up and moved out into the open where one could "take" her, then posed, licking the fawn's head as if to reassure it. We scored a bulls-eye, one of those shots after which all parties are happy, and there are no regrets in future years.

Flying Cafeterias

W. L. McAtee

The author of "Birds that Have Named Themselves" and "Bird Bartenders" has described in this article one of the more harsh though intensely interesting phases of bird Nature. Mr. McAtee is associated with the Bureau of Biological Survey of the Department of Agriculture. The illustrations of this article have been made by Nature Magazine's staff artist, R. Bruce Horsfall.

Suppose one were a flying creature and fed on winged food, how very convenient it would be, when travelling, to have that food fly right along! Realization that such an ideal arrangement actually exists came to the writer as he was watching the October migration flight of hawks at Stag Mountain, New Jersey. This mountain rises abruptly between two arms of Stag Lake, and just below its crest is a hopping-off place for migrating birds. From the hawk blind at this point were observed, every few minutes, sharp-shinned or Cooper's hawks slipping silently by close to the tree tops and out over the gap, or drifting onward far overhead as they soared in lazy circles. At the same time in the undergrowth and low trees about the blind, there was a constant flow of smaller bird migrants. Warblers were numerous and their curiosity respecting the decoy owl at the blind sometimes led several kinds of these dainty and beautiful birds to a fluttering riot about it. Before launching out for the next high land the warblers usually gathered in little companies. Wisplets of sweetly whistling goldfinches passed from time to time, and small flocks of sparrows, robins, bluebirds, and cedar waxwings worked down along this avian highway. Overhead, travelling in much the same manner as the hawks, was a constant, if unorganized, procession of chimney swifts.

Here were prey and predator flying wing and wing, and the inevitable reflection was, how lovely for the 'dators,—that is, the hawks. Study of the food of eighteen sharp-shinned hawks collected at the Stag Mountain take-off showed that so far as food was concerned at Stag, all was well in the world. With one exception these eighteen sharp-shins had fed on migrant birds. Between them they had picked up two thrushes, one warbler (further unidentified), two white-throated sparrows, three song sparrows, four myrtle warblers, and seven juncos. All good fresh food, very obligingly transporting itself along the chosen travel path of the hawks. Is this not, in truth, a veritable flying cafeteria, and a boon beyond compare, for Mr. Sharpshin and his relatives?

So much for Hawk Cafeteria, Number Umpty-steen, of Stag Mountain, New Jersey. Number Forty-leven, of Fisher's Island, New York, is even more interesting. These meaningless numbers indicate our ignorance of how many of these travelling cafeterias there are in the country, and as to which may be considered to deserve the rank of Number One.

Fisher's Island between the Connecticut shore and Long Island might be considered a stepping stone for a terrestrial being sufficiently gigantic to make the necessary strides. But do stepping stones mean anything to creatures of the air like our migrating birds? From the way the bird travelers follow out long points of land like Point Pelee, Ontario, and fly along chains of islands, as the Sea Islands of Georgia, it is evident that stepping stones are in high demand. Fisher's Island not only has this advantage, but it lies in the track of as mighty a migration as is known in this country.

Wildfowl that have bred in the Canadian Northwest, bobolinks that have summered across the continent even to British Columbia, and shore birds from the barren grounds, fly southeast, strike the Atlantic Coast, and for the most part follow it in their further migrations. They are joined also by brant and gulls from the Arctic Islands, by a small but interesting quota of birds from Greenland, and by a multitude of songbird migrants from the interior of the United States and Canada. Not only do birds use this great highway, but bats also and dragonflies, butterflies and probably other insects join the living stream.

Here is a flying cafeteria with resources far surpassing the modest one of Stag Mountain. All is ready, where are the patrons? Be assured, they are not lacking. Among the birds flying the Eastern Seaboard Air Route are predators of every degree. The hawks are there in force, the great eagle, the kingly peregrine, the clamorous osprey, the sly blue darters,—all, from large to small. But of all of them, the one which makes the fullest use of the travelling cafeteria, and which converts its autumnal flight into a veritable aërial banquet, is the pigeon hawk.

A REGULAR BOARDER

At the flying cafeteria is the pigeon hawk. The food is elusive, however, and won't stay still

This little fellow, ten to thirteen inches in length, a dashing falcon of the true noble blood, kills and devours birds larger than itself. It habitually strikes its prey in the air and swallows the smaller victims while on the wing. At the Fisher's Island Cafeteria

there is a surfeit to choose from; what does the pigeon hawk take? No doubt can be entertained as to its first choice, for dragonflies were found in three hundred and sixty out of five hundred and forty-seven stomachs collected at Fisher's Island. Only the larger kinds of dragonflies were taken, such as those having a body length of from three to three and a half inches, and a wing spread of from four to five inches. Many of the birds had dined on dragonflies alone, and the number taken at a meal commonly exceeded ten, and reached a maximum of thirty-four. Butterflies were next in preference, being taken by sixty-six birds, and in numbers up to twenty-eight at a meal. Most of the butterflies were the well known mourning cloak, having a wing spread of nearly three inches.

Among bird prey the pigeon hawk evidently takes whatever is handy, fully ninety kinds being identified from these Fisher's Island stomachs. But from the roster of bird victims we have further proof of this little falcon's expertness on the wing. Fifty representatives of five kinds of swallows, and the chimney swift, themselves among the swiftest flying birds, figure in the list, and all of them no doubt were captured in mid-air. Additional evidence of the pigeon hawk's preying on the fly is afforded by the presence of four species of bats on the bill-of-fare.

WHERE MIGRANTS GATHER

Here is the Cafeteria Oughty-ought, and the warblers, juncos, and kinglets make many a dish for the hawks

A few sample menus of the Fisher's Island pigeon hawks show tastes far from simple.

Combination No. 1
28 Butterflies
5 Dragonflies
1 Red bat

Combination No. 2
1 Butterfly
1 Dragonfly
1 Warbler
1 Barn swallow

Combination No. 3
1 Butterfly
7 Dragonflies
1 Ruby-crowned kinglet
1 Hoary bat

Combination No. 4
14 Crickets
1 Grasshopper
1 Song sparrow
1 Cape May warbler
1 Magnolia warbler
1 Robin

Viewed through the eyes of the pigeon hawk the Flying Cafeteria, Number Forty-leven of Fisher's Island, New York, is a wonderful success. Perhaps it really is the genuine Number One, and the best of all.

A DOLL *with* GREEN HAIR

by Walter B. Porter

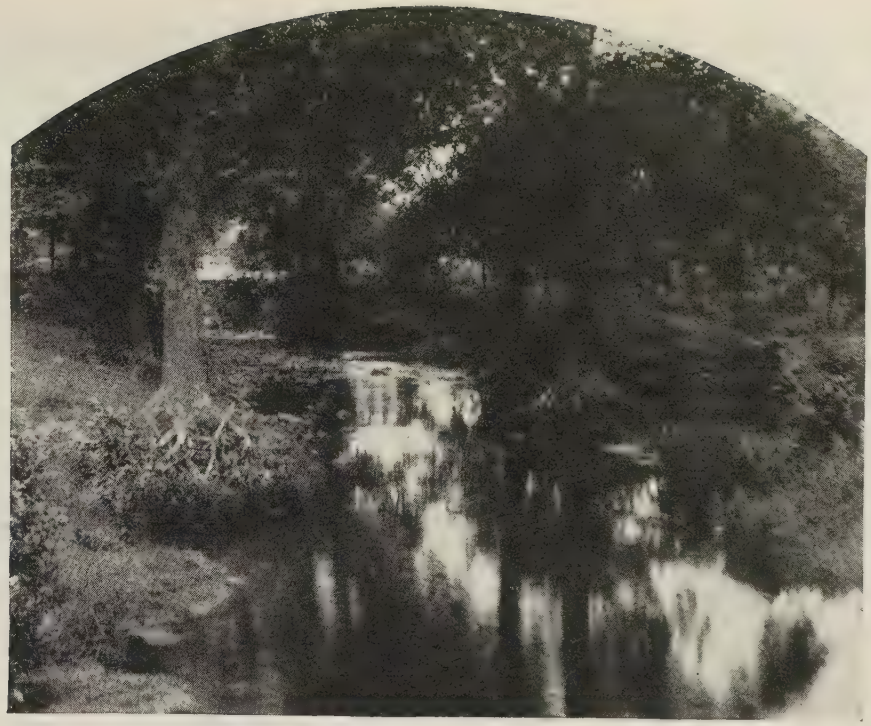
Possibly a doll with the name, reputation and hirsute adornment of Medusa might not be popular, but here is one that, while it didn't grow a crop of snakes, did have a living head of hair. It all started out as a lesson in seed germination and ended up as a possible rival to kewpies, teddy bears and Lenci dolls.

This is what happened. From a piece of muslin and by a pattern, a doll was cut out, sewed and stuffed with excelsior. In sewing, the head was left open for the proposed head of hair. Several materials were tried that would hold water and keep seeds moist and sphagnum moss from the florist proved the most successful. The top and the back of the head were covered with bobinette in place of muslin.

SOMETHING NEW IN DOLLS

This one has a head of hair much like your front lawn

With such a moist brain the face had to be waterproof, so after it was properly colored and decorated it was shellacked, the eyes, nose and mouth having been worked in with colored yarn. The head was watered and timothy and blue grass sown liberally over the top and back. While the seeds were sprouting the doll was consigned to a dark, warm place and then promoted to a sunlit window sill. And how the grass grew and the crop of luxuriant green hair prospered! Just try it and see.



THE PEACEFUL BROOK
It is not its fault that sewage is poured into it, and its beauty destroyed

The TRAGEDY of the BROOK

Once a Place of Joy, Now Oft Death's Henchman

By Paul W. Allen

"I come from haunts of coot and hern
I make a sudden sally
And sparkle out among the fern
To bicker down the valley"

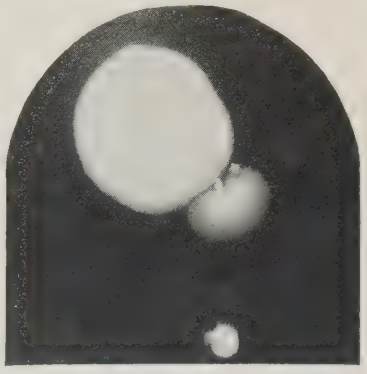
WE ARE very young, and it is spring. We follow down the winding brook—how we love it—with a cane-pole and line in one hand and a can of garden worms in the other. Boisterous is the stream, swollen with spring rains. We build a fire to warm us from the winter's breath still in the wind as we sit and fish for chubs at the head of foamy, swirling pools. We catch a big one in the "clear-hole", and get hold of a whopper in the "ten foot" pool, but lose him.

FROM THE BROOK
Typhoid, dysentery, and other diseases come from microbe-filled waters. This is a safe germ, however

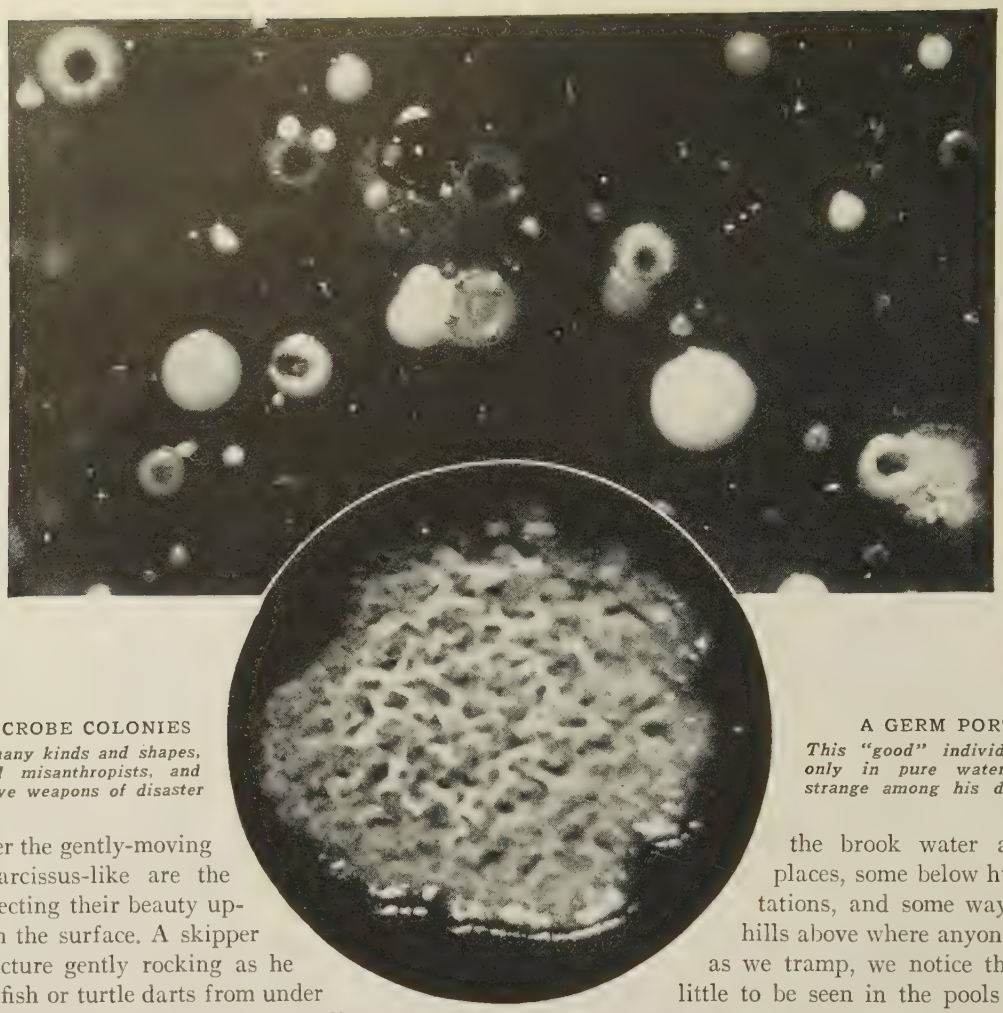
Then summer comes, and we loiter through July heat to the "ten-foot". The water has become clear, and moves lazily along, reflecting floating clouds. "First in", yells Joe, and the calm of the little brook is broken by the shouting and splashing of lithe, shiny forms that bob up and down.

Now it is fall. Again we follow the brook through the meadows and pastures. On and on it goes, while the church steeples of our little town go down out of sight in the horizon's haze behind us. We come to the spot where the waters make hilarious music as they tumble down into dark shadowy pools. Here we watch a late summer's insect accidentally light on the water, and suddenly be snapped beneath it, while the circling ripple widens. We put down our baskets half filled with chestnuts and peer cautiously in. Here and there a gray darting trout seeks shelter from our shadows as we lean over an old stump at the edge of the stream. We resolve to come back in the spring with hook and line, and what a thrill these trout will have as we fight them for supremacy!

And in the late fall we wander by the stream-side, watching the frost-struck leaves hang like marvelous oriental tapestries worked in gold, yellow, green



TO THE HOME
Cows drink from the little brook, and thirsty children, and death stalks in the wake. "Redeem that brook"



(Above) MICROBE COLONIES
Though of many kinds and shapes, they are all misanthropists, and carry effective weapons of disaster

A GERM PORTRAIT
This "good" individual is found only in pure water, and looks strange among his deadly fellows

and red over the gently-moving waters. Narcissus-like are the leaves, reflecting their beauty upwards from the surface. A skipper sets the picture gently rocking as he travels—a fish or turtle darts from under the rocks. The white, fleecy clouds of Indian summer loiter across the mirror of the brook. A late bird calls from the thicket. A trout jumps.

Memories now, but realities, built deep in our lives, were these days. They are gone. We are now old and we return to the brook to catch on its surface a reflection of our youth. But tragedy has come to the little brook. It has been defiled, spoiled. All the fascination and all the associations it had are gone.

The stream has become a vulgar thing, a despised and foul avenue for the passage of industrial wastes and sewage. There are sick people living along it now. The joy with which it laughed and gurgled in answer to the twitter of birds in the trees has become a heavy sadness. It murmurs in its melancholy way as it sweeps under the trees, "Keep away from me. I am as poisonous as a viper. I will kill you with typhoid and dysentery. Even the flies which light on my surface are deadly. Even the cows which wade in it against the summer heat are dangerous, because my mud contaminates the milk of their udders with deadly germs".

We decide to hunt along this stream which brought boyhood joy and a love for Nature to us. Not for partridges, with gun and dog, nor for rabbits or squirrels,—but for the defilers of our brook, the little ferocious things that are invisible, yet more dangerous because they cannot be seen. And we hunt along the side of our stream with bottles and corks that have been well sterilized by boiling,—we take samples of the brook water at different places, some below human habitations, and some way up in the hills above where anyone lives. And as we tramp, we notice that there is little to be seen in the pools and sandy bars. The trout and turtles are gone, even the minnows,—only a few dirty-looking suckers listlessly drift with the current. Just to be complete, we catch some flies that occupy themselves near the edges of the stream with gobs of greenish and brownish scum.

And we remember, while we are wondering just what we will do with our "bag", that old Doctor Bolton is still living near our old home. Old Doctor Bolton—one of those fine scholars who finds treasures in every moment, who putters around his rural laboratory with germs and microbes, who knows every flower and every tree, and who used to tell us where to find the nesting thrushes and how to watch for the raccoons on the hill. We take our bottles to him, and a curious smile lights up his fine old face when he finds we are interested in the tragedy of the little brook.

Without a word he sets to work, while we watch, eagerly, as if we were to see a miracle performed. He fills a skillet half full of water, sets it on a lighted burner, and places a cotton-plugged flask of jelly in it.

"That is some jelly I made yesterday", he explains. "Made it by melting up Japanese sea-weed in beef broth. The Japanese eat it as dessert, but I am going to use it as food for the germs in those samples of water you brought in".

When the jelly is melted he pours small samples of water from each of our bottles into small, round glass covers, then adds a little jelly to each dish, moving it gently to thoroughly mix the melted jelly and the water.

He also places some samples in tubes containing beef broth and milk sugar.

"Now I'll put these dishes and tubes in my incubator here where they will be kept at blood heat. In a couple of days you will see the germs as colonies growing on the jelly. Hold on, here's a fly. Watch what I do to him".

We watch as he takes forceps and places the fly, still alive, under the lid of a glass dish with solidified jelly in it. The fly is allowed to walk about for a few moments, then is taken out and killed.

"I will put this dish of jelly with the fly tracks with the others. It will be ready when the rest are. Come back in a couple of days, boys".

Boys! We were boys once, long ago, but that was when the brook was sweet and clean,—a treasure garden. That was before its tragedy.

It is a week before we get back,—business detains,—but the doctor has been patient. He shows us growths in the dishes and tubes. We have a new love for the old man,—he has sterling scholarship, not the scholarship of pedantry but that having to do with the moving forces in the world.

The old naturalist tells us the story of the water samples as we swap glimpses of them through the microscope.

"You see these colonies of bacteria growing on the jelly in this dish. Well, there are hundreds more colonies than there would be if this brook were not polluted with human sewage. Now notice how few germs are moving about in the water you got above the settlements. They are innocent germs, too, while the rest are criminal germs. They kill children and babes, and sometimes grown persons".

The doctor's eyes glint as he shows us the tubes containing milk sugar and beef broth which had been inoculated with our water samples.

"See these little inverted tubes on the inside of these tubes? Notice that some of them have gas in them which makes them float. Those that have gas are the ones containing the brook water that was taken below the houses. Those that do not have gas in them are the ones containing the hill water".

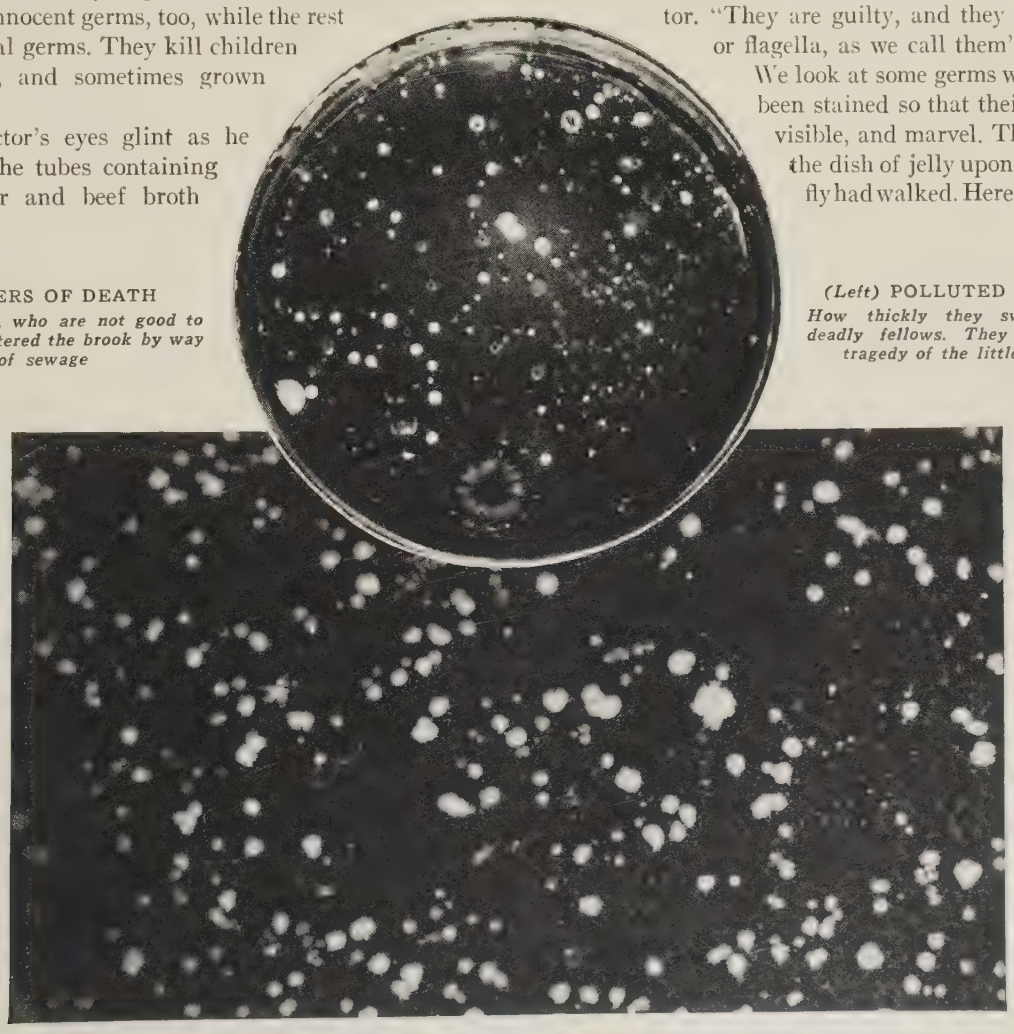
We hardly understood. It was all very confusing, although simple to the old naturalist. His eyes twinkled at us.

"It is a long story, this story of how we came to use these little gas tubes as a method of identifying water which has been polluted with human sewage, but I can explain it to you. Microbes are like people,—most of them are good, but some are thugs. We must have some way of recognizing the good from the bad. We must take fingerprints of the criminal microbes, just as of criminal humans. And we have discovered that a water germ which forms gas in this beef broth and milk sugar is a criminal. He belongs to the gang of typhoid and dysentery cut-throats. When you find him in brook water, in springs or in wells, you know that tragedy is going on. Here and there a child will die, and now and then a grown-up".

The old doctor lets us look at some red jelly on which he has taken further finger-prints of criminals found in our water samples. How they move about! It arouses our curiosity, the fact that they speed so fast.

"Why shouldn't they move fast", says the doctor. "They are guilty, and they have legs, or flagella, as we call them".

We look at some germs which have been stained so that their legs are visible, and marvel. Then we see the dish of jelly upon which the fly had walked. Here were germ



CARRIERS OF DEATH

These germs, who are not good to live with, entered the brook by way of sewage

(Left) POLLUTED WATERS

How thickly they swarm, these deadly fellows. They make "the tragedy of the little brook"

colonies growing at every point where the fly's feet touched the jelly.

"That shows that flies carry typhoid and dysentery germs from that brook to every house in the neighborhood which they can get in", we exclaimed.

"Yes, then they walk on bread and cake", the old man added.

We had much to discuss on our way home from the old naturalist's laboratory. We conclude that there should be a new slogan started in America. We have found one brook that has been polluted, but it is typical of other rural brooks which once made happiness for youth. We decide that here is one of the biggest problems in American rural life—sewage disposal. For the sake of saving lives, happiness, and the beauty of the brook, rural America must stop this tragedy of the brook, which is the tragedy of the people who live along it. We suggest a slogan,—"Redeem the Brook". Silently we part at our gates, each thinking of the tragedy which has spread over the land.

A "GOOD" GERM

One of the harmless inhabitants of drinking water, that causes no havoc to mankind

Perhaps we have little poetry in our lives, and our love of Nature has been dulled with years. Mayhap even the sportsmanship which loves to see fish in the streams has gone with the coming of materialism. But we still have respect for human life. That is enough to urge us to redeem the brook. It is the doctor who speaks, when we make another visit to him.

"The scientist is not dreaming when he says that stream pollution is one of the most potent causes of infectious diseases in America. Right at the time when we are fighting harder than ever before to eliminate such water-borne infectious diseases as typhoid fever and dysentery, we are also doing more than ever to contaminate streams, springs and wells.

"The vacation time has now become the most dangerous period of the year for many people, because the contamination of water supplies has become so general. In the city we are protected by elaborate water filtration plants and by the water control laboratory of the city public health department. But in the country there is no protection. People who were once advised to 'go to the country for health' are now urged to stay home. Physicians now recognize that there will be some typhoid brought back to the city from rural districts by vacationists".

"But what can be done"? we asked him.

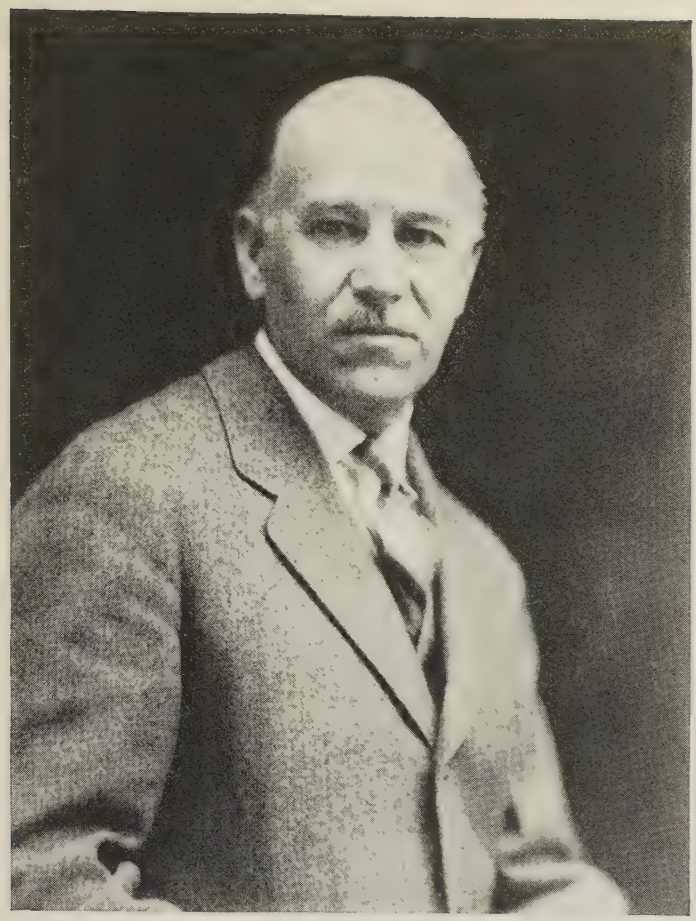
"Proper sewage facilities for the country", he said. "The scientist has worked out a method by which he can analyse a sample of stream water, spring water or well water and tell if it has been contaminated. Unpolluted spring water contains few germs. Water which has germs in it from the intestinal flora tells tragic stories, —it is not safe to drink. We must discover the sources of pollution,—we must eradicate them by more carefully built facilities. We must redeem our brooks".

"That is it," we cried together. "Redeem the brooks. That must be the slogan for rural America".

The doctor nodded. And when we left him he was still thinking of the crusade he would lead, if he was younger, to bring back to purity the curling streams that network the land. As for us, we were thinking of when we were very young, when our brook was beautiful and safe, and how its tragedy must be stopped, its sparkling, darting life restored, and its health-giving waters again made clean.

"Here is a task for us", John said to me. "A life task for both. We must redeem that brook".

I silently acquiesced. I was thinking of typhoid and dysentery moving over the face of the land, following the twisting, tumbling curves of gently-babbling waters.



Louis Agassiz FUERTES

Whose Life Made Other Lives Richer

by E. Laurence Palmer

THIS brief story of the rich life of Louis Agassiz Fuertes is written by a close friend and associate. Dr. Palmer, well known, of course, to readers of Nature Magazine as its Director of Nature Education, was a fellow-member of the Cornell faculty, and there his work embraced much of that of Fuertes.

Two or three years ago the writer sat down to lunch with a man who seemed unusually nervous. His companions at the table were a publisher, a college professor, a cigar merchant and a politician. They one and all affectionately spoke to their companion as "Louie" and teased him about his peculiar behavior. He confessed that the next day he was to give a lecture on ornithology to a group of college students and he was far from certain as to how it would come out. Yet there was probably no person living better qualified to talk to young people on the subject of birds than Louis Agassiz Fuertes. As was characteristic of the man, however, he entered into the spirit of the occasion and was soon laughing at himself. During the course of the meal, he sketched on scraps of paper clever caricatures of persons well known to all and supplied brilliant repartee to the general conversation. At that one meal he illustrated many of the outstanding qualities which endeared him to all who knew him. He was humble, able, clever, a real friend, and his appeal was not limited to particular types of people.

To the public in general, Louis Fuertes was best known by his illustrations of birds. It was he who illustrated the monograph on "The Birds of New York" and the more recent "Birds of Massachusetts". It was he who drew the pictures of dogs and wild mammals published in the *National Geographic Magazine* a few years ago. He contributed worthy bird pictures to the pages of various publications. Instead of being mere color maps of birds, Fuertes' illustrations, practically without exception, showed some characteristic pose that made a special appeal. This may be seen in the backgrounds he painted for many of the groups to be found in the American Museum of Natural History.

Fuertes rose to fame as a bird artist with spectacular rapidity. After the first public showing of his work in 1897 Elliott Coues declared, "I say deliberately, with a full sense of my words, that there is now no one who can draw and paint birds so well as Mr. Fuertes, and I do not forget Audubon himself when I add that America has not before produced an ornithological artist of equal possibilities". From that time until his death a year ago he continued to produce superior work. His genius and ability as an artist were amply recognized by publishers and the public in general to such an extent that he was rarely if ever free to paint only those things which might appeal to him. It was his determination that when he had finished the contracts already entered into that he would devote his talents to the production of pictures which might or might not have commercial value. And few people were more severe critics of his work than was Fuertes himself.

Few bird artists had the opportunity for travel which came to Fuertes. He availed himself of every opportunity to know more of birds in the field. The writer will always remember his exuberance on the eve of his departure for Abyssinia, from which trip he had only recently returned when he died. His travels took him to Saskatchewan, the Gulf of St. Lawrence, Mexico, Bering Sea, Florida, the Bahamas, Yucatan, Colombia, Alberta and various parts of the United States. He always returned from these trips well supplied with study skins, field sketches of birds, and firmer friendships with members of the expedition. As a camper, he bore more than

his share of the work and in emergencies it was he who most often supplied happy solutions of the difficulties. On his last trip, the party could no longer make suitable gifts to the dignitaries visited and Fuertes solved the problem by making sketches of important leaders and presenting them with their pictures in lieu of what might have been considered more valuable gifts.

Fuertes was most generous in his approval of the good work of others. The last statement the writer heard him make was in glowing praise of a moving picture of a bobolink taken by his friend, Dr. A. A. Allen. He could be equally caustic in his disapproval of certain things. Among these was his outspoken lack of sympathy with the vermin campaigns fostered by certain powder companies for the wholesale killing of such forms as the hawks and owls. He felt justly that campaigns influencing the destruction of wild life should be carried on under the direction or at the instigation of such organizations as the Biological Survey rather than of the most powerful powder-producing company in the country. In an open letter to the president of this concern he wrote:

LOUIS FUERTES BY HIS FIRESIDE

Ithaca, New York, was his birthplace and always his home, and he was its most-beloved citizen

"I think such activities as club 'side-shoots' is nothing short of nefarious and degenerate, and absolutely and directly in opposition to all the good, hard, slow work of conservation education that is just beginning to bear fruit. . . .I don't believe in your plan. I don't think that it is at all appropriate for any ammunition company to put on a campaign like this and I wonder seriously if the Biological Survey is going to lie dormant and tacitly agree to abide by it".

Unfortunately Fuertes used his pen but little. This need not be taken to mean that he could not write. Writing of the call of the Tinamou he said; "I think no sound I have ever heard has more deeply reached into me and taken hold. Whether it is the intensity of feeling that a deep, silent forest always imposes; the velvet smoothness of the wailing call; the dramatic crescendo and diminuendo that exactly parallels its minor cadence up and down a small scale; something, perhaps the combination of all these, makes one feel as if he had been caught with his soul naked in his hands, when, in the midst of his subdued and chastened revery, this spirit voice takes the words from his tongue and expresses too perfectly all the mystery, romance, and tragedy that the struggling, parasite-ridden forest diffuses through its damp shade". His ability to record and repeat bird music was almost as marvelous as his ability to observe and paint the makers of that music. It is interesting to note in this connection that Fuertes recognized the orchard oriole that bears his name as a new species by its song before he had ever seen the bird.

Fuertes' ability in specific fields did not limit his interests in others. He was a leader in music, art, biology and exploration and was welcomed as a leader by young, inexperienced persons as much as by highly-trained technical men and women. His willingness to be of service to others was general and he would drop important work to help a worthy boy scout.

Fuertes' father was at one time dean of civil engineering at Cornell University, and Louis Fuertes was born in Ithaca. He considered it and made it his home throughout his life. But for the friendship of Liberty Hyde Bailey, Fuertes might have made little of his great gifts and have gone into engineering or architecture. His contact with Elliott Coues came shortly before he graduated from Cornell. His success was so spontaneous and the opportunities for doing work that he liked so great that there was never any question after 1896 as to where his work lay. At that time, Fuertes was twenty-two. When he died in 1927 as the result of an automobile accident at a railroad crossing, he was in his prime, physically and mentally. The great loss to civilization cannot be made up. A New York paper said at the time of his death that the state could have afforded to eliminate every single grade crossing within its boundaries at its own expense if by so doing it could have saved such a one of its citizens as Fuertes.

When the Emperor Nicholas honored the great Audubon for his work and presented him with a valuable ring, his home townsmen were disgusted. One of them remarked, "That's just my idea of these imperial Emperors; they never have anything for a poor man, but give their diamonds and gold to loafing cusses, who are too lazy to work, and so make a living shooting little chippin-birds, and then drawing their picters". Though there were no other residents of Fuertes' home town making a living in the same manner that he did, there was no one who questioned that Fuertes was Ithaca's best-liked citizen and Cornell's most-beloved alumnus.

Fuertes has been dead less than a year. Already appropriate memorials to him are under way. A Fuertes Room has been dedicated in McGraw Hall at Cornell, where Fuertes was for two years a lecturer in ornithology.

The room contains originals showing the progress of the artist's ability during thirty years. There, too, are stored his collection of bird skins used in making the pictures. Field sketches and other records are there for those who wish to see these evidences of his methods.

The local boy scout council has changed its name to the Louis Agassiz Fuertes Council in honor of the man who was for years chairman of its camping committee.

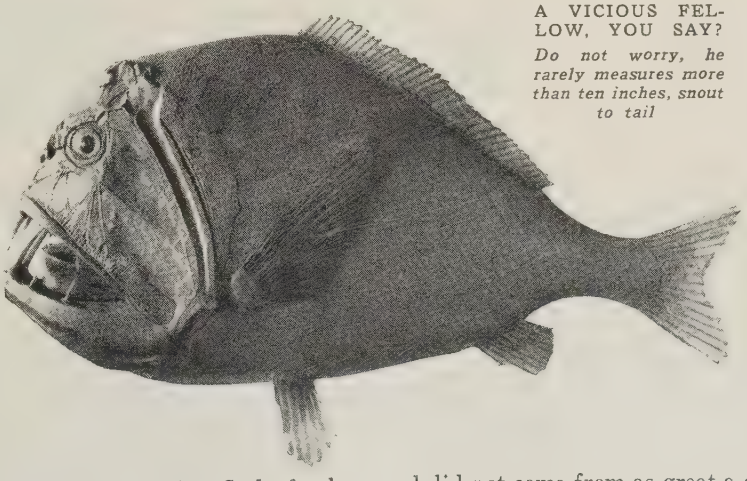
In addition, the townsmen have set aside a portion of the city park at the head of Cayuga Lake as a Louis Agassiz Fuertes Water Bird Sanctuary. Funds have been raised to make this worthy of the name it will bear and Ithaca may eventually have something which will compare with Oakland's Lake Merritt. Adjacent to the ponds for water fowl will be a local museum where one may find help in identifying whatever birds are to be seen about the sanctuary. This sanctuary will be linked up with a bird park further inland which has been for years under the protection of the Cayuga Bird Club. The club was long honored by having "Uncle Louis" as its president. The whole development will be the completion of plans which Louis Agassiz Fuertes had in mind. Nothing could be a more appropriate memorial to the man than a sanctuary which would encourage public interest in and increase public sympathy for the birds that he loved.

Recognition of Louis Fuertes will not be limited, and has not been limited, to his home town. Wherever people have been led by his pictures or by his personality to a greater appreciation of wild life and a sane type of Nature education there will be those who by acts and thoughts will honor him who gave so much to men.

CAULOLEPIS LONGIDENS

by James N. Miller

FEROCIOUS looking indeed is this rare deep sea navigator. He boasts no popular name because only four such saw toothed swimmers grace the official record sheets of the Smithsonian. Number one catch was located in the Atlantic back in 1883 by that famous Bureau of Fisheries steamer, the old *Albatross*. Some years later a confrere was fished up in the Pacific.



A VICIOUS FELLOW, YOU SAY? *Do not worry, he rarely measures more than ten inches, snout to tail*

Curious, is it not, that though he looks ferocious to the eye in his dressed-up mounted form, he would be anything but scary were we to see him in the living flesh, for he measures only seven to ten inches from tip of tail to snout? Stranger still, most of the deep sea maneuverers are even smaller than he, despite the imaginative writings of some of our modern Jules Vernes, who are prone to picture them as gigantic monstrosities, ready and willing to engulf human beings in a single swallow, were they so unfortunate as to be able to penetrate the ocean's vastness and to encounter these monsters.

The probable reason that the deep sea fishes are so small, as explained by Dr. Austin Clark of the Smithsonian Institution, is that there is very little food to be had in the open ocean, particularly in regions far from land, because most of the food for the ocean dwellers comes from the land via the rivers.

The deepest deep sea creature on record did not come from as great a depth as many believe. It was a fish, brought up from three and three-quarter miles below the surface of the North Atlantic by the late Prince of Monaco. However, the fact that it was caught at that depth does not necessarily mean that the fish does not reach even greater depths, and there find other species.

FIRST PRIZE

Room for Improvement on the Petersburg Pike in Virginia

MRS. JANET S. DURHAM
Richmond, Va.

WELCOME HERE
Dear Public:
They say if I let you picnic here you will ruin my property. I don't believe it so will try my experiment for a year. Please back me up by building no fires and disposing of your rubbish. If you pick the wild flowers there will not be any another year. This is a game preserve, so do not shoot.

HERE *are two pages of the winning pictures in our Outdoor Good Manners Photographic Contest. The pictures, we feel, speak for themselves. The prize picture well illustrates one of the most difficult phases of outdoor advertising to control,—the "fly-by-night" poster stuck here, there, and anywhere. The second prize illustrates a type*

HONORABLE MENTION

An Excellent Idea

H. S. WAGNER Akron, O.

THIRD PRIZE

Let's Picnic Here

ARTHUR W. NELSON Worcester, Mass.

This— or —This?

THIRD PRIZE, HARRIET WILLIAMS MYERS, Los Angeles, Cal.

SECOND PRIZE

Some Roadside "Decoration" in California

HELEN M. GRAHAM
Pasadena, Cal.

of roadside "adornment" prevalent in California. The two sets of pictures at the bottom of these pages are studies in contrasts. It is not necessary to ask which is preferred.

In publishing these pictures Nature Magazine reaffirms its campaign for Outdoor Good Manners and Billboard Restriction.

HONORABLE MENTION

Aiding the View

INKERMAN BRYCE Ontario, Can.

THIRD PRIZE

A Dangerous Corner

ANITA D. SHEPARD Corydon, Iowa

Before— and —After

HONORABLE MENTION, JULIA W. WILLIAMSON, Philadelphia, Pa.

What Price—Beauty?

It Cost the Passing of the Carolina Paroquet

by Alexander Sprunt, Jr.

Curator of Ornithology, Charleston, S. C. Museum

THE ALMOST tropical sunrise burst in radiant glory over the shimmering reaches of water and dark green vegetation of the Everglades. Life,—vibrant, pulsing life, greeted the shining orb with characteristic fervor. Flocks of red-winged blackbirds wheeled and circled over their domain of marsh and sawgrass, fluting their liquid "oak-a-lee" in happy, carefree enjoyment. Queer, chicken-like gallinules paddled here and there among the reeds, scrambling over floating bunches of decaying vegetation with agile ease, bobbing heads and flirting tails as they searched out their living from the watery retreats.

Large blue herons, and, now and then, a stately, snow-white egret flapped slowly along, looking for a convenient log from which to watch for finny prey. Dainty little yellowthroats perched upon the swaying stems poured out their lilting melody, and from a green thicket near by the clear-cut, mellow whistling of a cardinal pealed out at regular intervals. Somewhere a mockingbird was greeting the birth of day with a burst of lyric music, the rich, full throated chorus rising and falling as the mood of the versatile singer changed from lazy soliloquy to rapturous heights of avian vocal artistry. A brilliant flash of red, green and blue, like a trail of vari-colored sparks, showed where a nonpareil darted about a thick bush, wherein his soberly attired mate guarded the speckled treasures in the neat, grass-built home.

Suddenly, near a clump of pines, on the edge of an open grass grown savannah, a rolling burst of clamorous notes struck, almost discordantly, upon the tranquil air. In darting, erratic flight, a small band of brilliant green and yellow birds swept over the open, and, alighting in the pines, fell to preening their beautiful plumage to a subdued murmur of clucking, contented notes. The resulting color scheme was perfect, the glossy green of the pine needles, shining in the sun's rays with a thousand glinting points, the bright yellows and greens of the sitting birds as they, too, caught the scintillating rays, made a picture indescribable.

THEY PREENED THEIR BEAUTIFUL PLUMAGE TO A SUBDUED MURMUR OF CLUCKING, CONTENTED NOTES

"Ah," you exclaim, "how I would thrill to such a sight!" Aye, so you would, but—you never will.

Gone are such glimpses forever, vanished from human eyes for all time. Never will the wild beauty of the Everglades be made richer by the contrasting greens and yellows of the Carolina paroquet. Even this last stronghold has crumbled, and this beautiful bird, the only member of the parrot family found in the eastern United States, has joined the ranks of the departed, and, like the passenger pigeon, great auk, and Labrador duck, is but a haunting memory.

* * *

The range of this interesting species once embraced a goodly portion of this country. Many years ago it was found as far north as the Great Lakes, eastward to the Atlantic coast, and west to Colorado and Texas. It was well known to the early settlers, and many were killed then because of the attractiveness of their plumage, a direct cause of their final disappearance. Like so many other species, this bird was forced to retreat before the advance of civilization. The clearing of the country, the increase of population, and, as always, the man with a gun, joined to force the rapid decrease of their numbers.

In habits, this paroquet resembled many others of this very interesting family. They were fond of each other's company, often going about in large flocks, and roosting together in numbers. Little is known in regard to the nesting, and, strangely enough, information on this

subject is divergent and contradictory. Those keen naturalists, Audubon and Wilson, stated that they invariably bred in the hollows of trees, but the late William Brewster, investigating in Florida about the year 1888 or 1889, found that observers there, both educated and illiterate, had seen the nests on branches of trees, describing them as to a great extent resembling those of the mourning dove. It seems odd that testimony should be so different, and Edwin Hasbrouck, writing in *The Auk* in 1891, suggests that, like some of the owls, these paroquets nested either in holes or built on branches, according to conditions. This is, at least, a reasonable view. Very little is known, at any rate, about this phase of their history. The eggs were said to be four or five, and white in color. Most of the specimens in present day collections were laid by birds in captivity.

Dr. F. M. Chapman found the birds in Florida in 1889, and gives an excellent account of his observations. They were very locally distributed even then, and it was some time before he was fortunate enough to find them and then after a long search.

GONE IS THE LAST OF THESE BIRDS. THE ONLY PARROT NESTING WITHIN OUR BORDERS

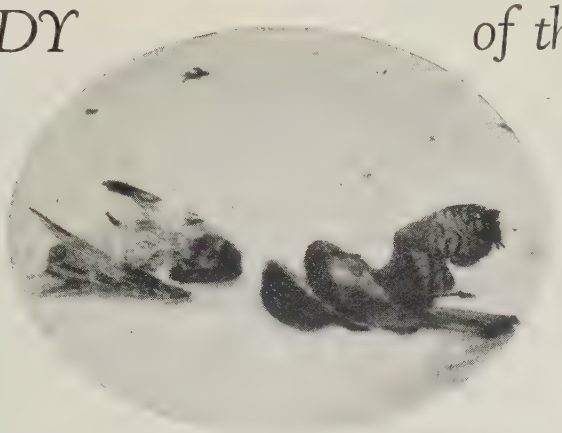
The causes which led to the extermination of the Carolina paroquet were, in the main, three in number, all of perhaps equal importance. Because of their fondness for fruit, they were killed in multitudes for their depredations upon orchards, and it is doubtless true that they did make considerable inroads on the crops. Naturally this brought down upon their heads the wrath of the planter, and they suffered accordingly. Men who made it a business of supplying dealers with cage-birds, trapped the paroquets in thousands for this purpose, and, lastly, the millinery trade demanded their beautiful plumage as ornamentation. Like other unfortunate birds who wore bright colors, the Carolina paroquet became a martyr to fashion. Besides these cardinal reasons, many birds were killed by promiscuous hunters. It will be seen, therefore, that with such destructive agencies at work, the ranks became rapidly thinner, until, throughout the East, they totally disappeared.

For a while, some lingered in what was then known as the Indian Territory, and Arkansas. Florida, however, was the last stronghold, and they persisted there in small numbers after being wiped out everywhere else. No recent reports of them have been received, and although not considered absolutely extinct by some, there is little doubt but that the species has disappeared completely. The evidence of recent years goes far toward substantiating this belief. It is extremely doubtful whether even the Everglades holds another paroquet. In the extermination of this beautiful and interesting bird, another stone has been added in the monument to the destructive power of mankind, that has laid waste a Nature Paradise.

A TRAGEDY of the MARSH

What Killed These Birds?

by K. Harrington



THE MUTE EVIDENCE
The cold forms of two scourges of the air lay on the sand. How did they die?

One morning, a marsh hawk and a barred owl were found on the marshes near Seaford, Long Island, in New York state. No shot wound had killed them. A broken upper wing-bone on the owl was the only mark of violence. How did they come to die?

These two birds never molest each other. Both predatory, they seem content to hunt in their own ways, and respect each other's rights. Perhaps a late-returning owl met an early-rising hawk in the morning dusk, and mistook him for another. The hawk may have thought the owl was a duck, and in the ensuing battle, both fell to earth and were killed. Whatever the cause, tragedy was the outcome, and there was none to mourn, while smaller birds, released from these enemies for all time might have offered up thanksgiving for the death battle, had they been witnesses of this Armageddon.

HINTS AND HELPS for HOME AND GARDEN

SEPTEMBER

by Harry R. O'Brien

SEPTEMBER vies with April as being the most important month of the year for planting work in the garden. It is the best month for oriental poppies and peonies, it is still quite satisfactory for iris, it is good for evergreens and by the end of the month it is time to plant the rock garden. Any time during the month is suitable for moving things to and fro amid the perennial border.

* * *

September 15 is the beginning of the peony planting season in Ohio, where I live. The correct time anywhere is to wait until after the roots are dormant. Then dig, divide and transplant. Or buy and plant, if you do not already own the varieties you want.

* * *

In buying peonies, don't look for bargains. No reputable grower charges less than fifty to seventy-five cents for any peony except perhaps for three or four old fashioned sorts. Prices won't vary much, regardless of where you buy them. On the other hand, unless you have lots of money or are getting a fancy collection, don't pay high prices for the rare and newer sorts. High price does not necessarily indicate quality but rather scarcity and newness. Styles change.

* * *

Buy peonies by name only. Take into account the rating. The figures before the names in the catalogs indicate the rating that has been given by vote of the American Peony Society with ten as perfect. If you expect to become a peony fan, and have a collection to show off to your friends, don't buy varieties that rate below eight, unless you have seen them in bloom. The highest rated peony in the world is Le Cygne or The Swan, which rates at nine and nine tenths and sells for around $10.

* * *

A good collection of peonies for a beginner would include Festiva Maxima, Mons Jules Elie, Sarah Bernhardt, Marie Crousse, Baroness Schroeder, Karl Rosenfield, Eugenie Verdier and the Japanese one, Mikado. A second list, running higher in price, might include Therese, Solange, Milton Hill, Frances Willard, Lady Alexandra Duff, Richard Carvel, Martha Bullock, Walter Faxon and M. Martin Cahuzac. The finest in the world, regardless of price, would include Le Cygne, President Wilson, Phillipe Rivoire, Kelway's Glorious, Auguste Dessert and Mrs. A. M. Brand.

* * *

This is the month when the aconite or monkshood is at its best. If you do not have any in your garden, look for some and after seeing it, resolve to grow it yourself next year. There are several varieties listed in the catalogs.

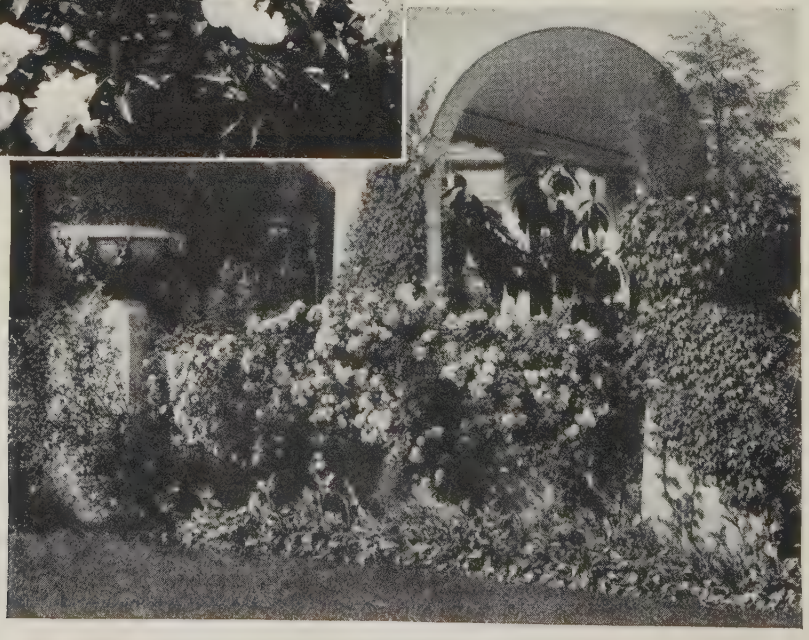
* * *

The novice begins a perennial border in the spring, the old hand often

THIS IS PEONY TIME
Cull catalogs carefully before you choose, and then buy from reputable dealers

HOW ABOUT BORDERS
The old hands are now planning and spading, and moving the ordinary perennials

ERNEST CRANDALL



prefers to begin in the fall. If not already in shape, the ground should be laid off as to outline and thoroughly spaded, working under well rotted manure if such be handy. This can be done in September.

* * *

Next, the border should be planned on paper before being planted in soil. If some coordinate paper with its tiny ruled squares is at hand, it is easy to plot things to scale. Locate on this the clumps of the more important plants that will form the backbone of the border—delphiniums, phlox, aquilegias and the like. Don't plan to have things too close at first. Give the plants room to grow. Leave nooks here and there for sticking in something new that you come across.

* * *

During this month begin moving things into your border, following out your plan. If the ground is friable and loose and well drained, almost all of the ordinary perennials can be moved. If it is not well drained or if it is sticky clay, move only those things which will take root and make a growth yet this fall. Wait until next spring for some of the more tender things, as anemones. Unless the fall rains have set in, better water in everything planted.

* * *

September is a good time for constructing a rock garden, but the actual planting might well be left until October unless the weather is quite favorable. The purpose of a rock garden is not to show off a pile of rocks but to provide a natural place of growth for flowering plants that thrive best among the rocks.

* * *

One important essential in constructing a rock garden is to utilize the natural contour of the land that exists. A second is to see when putting in rocks, that each tilts backward so that water runs back into the ground and is preserved. A third is to ram the dirt back to the end of each pocket—and also make the pockets deep enough.

* * *

If you order your rock garden plants from a distance, the end of the month should see the order off. The beginner's list might well contain *Alyssum saxatile compactum, Arabis alpina, Cerastium tomentosum, Nepeta mussini, Myosotis alpestris* or *palustris, Phlox subulata rosea* and *Veronica rupestris* blue. Another list of better sorts would include *Aster alpinus* Goliah, *Anchusa myosotidiflora, Phlox subulata* "Vivid" and *lilacina, Campanula carpatica, Ajuga genevensis, Saponaria ocymoides splendens, Silene shafta,* one or more thymes, *Saxifraga decipiens, Dianthus deltoides* and all the sedums you can afford.

* * *

Sedums stand at the top of the list as rock garden plants. They are perfectly hardy. Any piece of them stuck in the ground is sure to grow. They spread rapidly. For low growing, ground covers, *Sedum acre, S. glaucum, S. sarmentosum* and *S. sexangulare* are among the best. For those with interesting foliage, that rise a little above the ground and have worth while bloom, there are *S. sieboldi, S. stoloniferum and S. stoloniferum coccineum.*

* * *

While September is an excellent month for moving evergreens, do not be in a hurry to plant deciduous shrubbery and trees. Get the ground ready but wait until later in the fall, after the leaves begin to fall and the plants are about dormant. If shrubbery is planted this month, prune rigorously immediately after planting.

* * *

It is still time to plant your best oriental poppies.

PLANT ORIENTAL POPPIES
Lilies, too, and Darwin tulips, must be added to the September list

NOW ROCK GARDENS
There are sedums and varieties of phlox, among others, for the most natural of gardens

ERNEST CRANDALL

MOONLIGHT
Near The Poles

Phenomena of the Frigid Zones

by Isabel M. Lewis

It is difficult for anyone who has never been within the frigid zones to comprehend how greatly such familiar phenomena as sunrise and sunset and moonrise and moonset are affected by a comparatively small change in latitude near the poles of the earth.

If we should travel northward to the eightieth parallel of latitude we would find that there from about October 20 to February 24, the sun never appears above the horizon. During this period the moon reigns supreme as chief luminary so long as she is above the horizon, which is for about fourteen days each month.

As is well known, the moon takes about twenty-nine and one-half days to make one revolution around the earth from new to new or from full to full. During this period it makes a circuit of the heavens through the zodiacal constellations over nearly the same path that the sun travels in the course of a year. When the moon is full it is nearly in the same position as the sun was six months before. So it follows that when the sun is *below* the horizon in Arctic or Antarctic regions the full moon always is found *above* the horizon, shedding its greatest light at a time when it is most needed. In the Arctic or Antarctic summer, on the other hand, when the sun is above the horizon for days or weeks at a time the full moon is always below the horizon. In the winter in the frigid zones the moon will be above the horizon each month from about the time of first quarter through the phases of gibbous, full and gibbous again until near the time of last quarter, when it will disappear below the horizon. The crescent moon is never seen at midwinter near the poles of the earth. In summer in the same latitudes, however, the moon is above the horizon only when it sheds little or no light: that is, from about the time of the third quarter through new moon to first quarter. The full moon or the gibbous moon, which in winter in the frigid zones takes the place of the sun for days at a time, is never seen in the same latitudes in midsummer. Neither are the stars visible in midsummer in high latitudes, nor the splendors of the auroral displays which, with the stars and moon, furnish the only illumination afforded the inhabitants of the polar regions in midwinter. The gorgeous celestial displays granted to those who dwell in the far North or the far South in midwinter during that night which lasts for weeks at a time is almost beyond the comprehension of those who have never witnessed them. The vast stretches of snow and ice serve to intensify and reflect the glittering splendor of the stars, the moon sheds silvery radiance over all and the aurora, with its curtains and shafts and streamers of tremulous light that assume such an infinite variety of forms and that may be seen at its best only in the Arctic and Antarctic regions in winter, form indescribable wonders over the land of ice and snow.

Mrs. Lewis is extending the scope of her sky articles with each new month, and eventually is to cover in her series the more important of the phenomena which have caused men to wonder since they began to notice the heavens. As a member of the staff of the Nautical Almanac Office, she is closely in touch with new developments in the astronomical world, and can keep readers of Nature Magazine abreast of the times regarding things celestial and starry. Her articles, if kept, will form the nucleus of a worth-while collection of material on the skies. The star maps are valuable also.

At the beginning of fall, which occurs this year in the northern hemisphere on Sept. 23 at 2:06 a.m. Eastern Time, the long winter of six months duration begins at the north pole and the equally long summer at the south pole. During the next six months the sun will never rise at the north pole nor set at the south pole. Refraction, which causes the sun to appear above the horizon for a short period before it has actually risen and which makes it visible for an equal length of time after it has actually set, gives the polar regions a few more days of sunlight than they would otherwise have. Also it brings the phenomena of the midnight sun to those who live but a few minutes of latitude outside of the Arctic and Antarctic Circles, a phenomenon otherwise restricted only to those within the frigid zones.

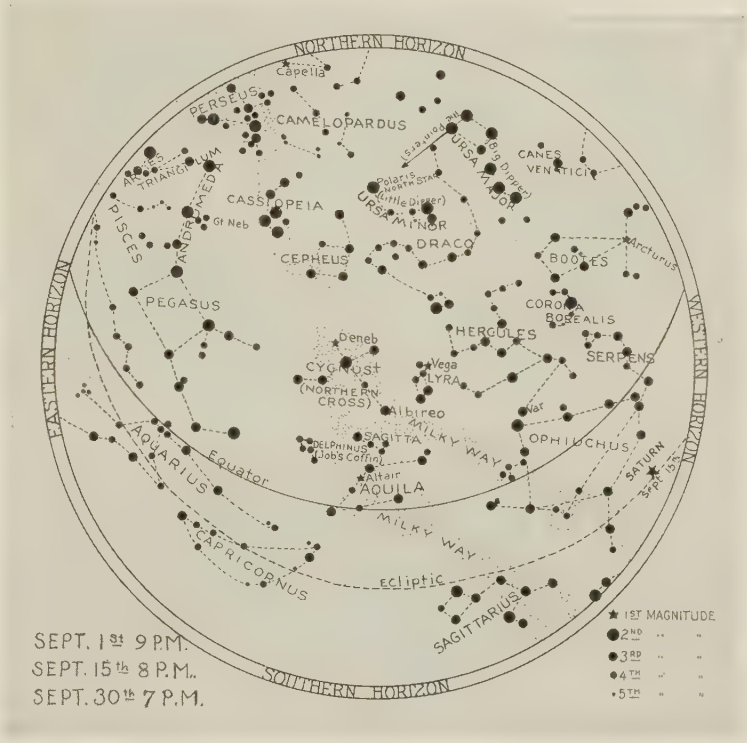
It is only at the north and south poles of the earth that day and night are six months long. At the Arctic and Antarctic Circles, neglecting the effect of refraction, there would be but one day in the year, that of the summer solstice, when the sun would not set and the phenomenon of the midnight sun would be observed; and but one night, that of the winter solstice, when the sun would not rise.

It is very easy to determine how many days of continuous daylight and how many days of continuous darkness will be found at other latitudes within the frigid zones. One need only compare the declination of the sun at different times of year, which may be found in any almanac, with the angular distance of the place from the pole, or ninety degrees minus its latitude. If the place is in north latitude when the sun's declination is north and greater numerically than ninety degrees minus the latitude the sun will not pass below the horizon. It will be at its highest altitude when due south and at its lowest altitude when due north, when the phenomenon of the midnight sun is observable. When the sun's declination is south and again numerically greater than ninety degrees minus the latitude the sun will not rise. The period of continuous night for a place within the Arctic Circle will be the same as that of

continuous day for a place within the Antarctic Circle that is equally far south. Let us take, for example, a place in seventy-five degrees north latitude. If we subtract this latitude from ninety we get fifteen degrees. In the almanac we find that the declination of the sun is over fifteen degrees south from Nov. 4 to Feb. 9, so between these dates the sun will be continuously below the horizon in latitude seventy-five north. Also we find that from May 2 to Aug. 13 the sun's declination is over fifteen degrees north so between these dates the sun will not set. Vice versa, in latitude seventy-five degrees south, the period from Nov. 4 to Feb. 9 will be one of continuous day and the period from May 2 to Aug. 13 one of continuous night.

Two planets will be in quadrature, or ninety degrees distant from the sun, this month. Saturn will be in quadrature on the fifth when it will be ninety degrees east of the sun and therefore on the meridian at sunset. It will be a fine evening star in the western sky throughout the month in Ophiuchus. Mars will be in quadrature on the fourteenth when it will be ninety degrees west of the sun and on the meridian at sunrise. It is now in Taurus and rises at midnight. It is increasing in brightness and by the end of the month will be brighter than Vega, or Arcturus.

Venus is still too low in the western sky at sunset to be seen to advantage. Mercury reaches its greatest eastern elongation on the twenty-ninth but will be so low in the southwest that it will be found with difficulty. On the thirtieth it will be in conjunction with Venus and about three and one-half degrees south of the far more brilliant Venus. It may be possible to locate it with the aid of binoculars though both planets will be very low in the southwest at sunset and hard to see.



TO USE, HOLD OVER HEAD WITH TOP TOWARD THE NORTH

Fomalhaut in the Southern Fish, and Pegasus and Andromeda well warrant inspection this month. Saturn and Jupiter reign among the planets

Jupiter now rises before midnight in Aries and is a magnificent object, far outshining all other stellar objects in view.

Cygnus, The Swan, and Aquila are now on or close to the meridian in the early evening. Scorpio is now passing below the western horizon and Sagittarius is in the southwest, always easily recognized by its characteristic little dipper inverted toward the southern horizon.

There will be an occultation of the star Phi in Sagittarius by the moon this month. This is the third magnitude star at the juncture of the bowl of the dipper with the handle. This occultation will occur on September 22 but will be visible only in the eastern and central states. The immersion or disappearance of the star behind the moon will occur before or very near sunset so will not be visible without the aid of binoculars or a telescope. The time of emersion will differ in different localities but will take place at Washington at 7:27 p.m. Eastern Time, one hour and thirty minutes after the disappearace or immersion of the star.

Among the constellations, Fomalhaut in the Southern Fish is now rising in solitary splendor in the southeast, and Pegasus and Andromeda are also well in view by this time in the east. Cassiopeia and Cepheus will be found high in the northeastern sky as the Big Dipper slopes downward toward the northwest.

The brilliant Arcturus in Boötes will soon disappear in the northwest but Vega, in Lyra, is still shining like a resplendent diamond high overhead directly west of the Northern Cross in Cygnus and east of Hercules.

Saturn is the only planet conspicuously in view at this time, as Venus disappears in the west shortly after the sun and Jupiter will not rise until later in the evening in the northeast, where it is very brilliant.

A SCIENCE CARES FOR SUCH STURDY MONARCHS

"FAIR PLAY FOR THE TREES" IS ITS SLOGAN

TREE SURGERY

An Exacting Science in the Interests of Our Shade

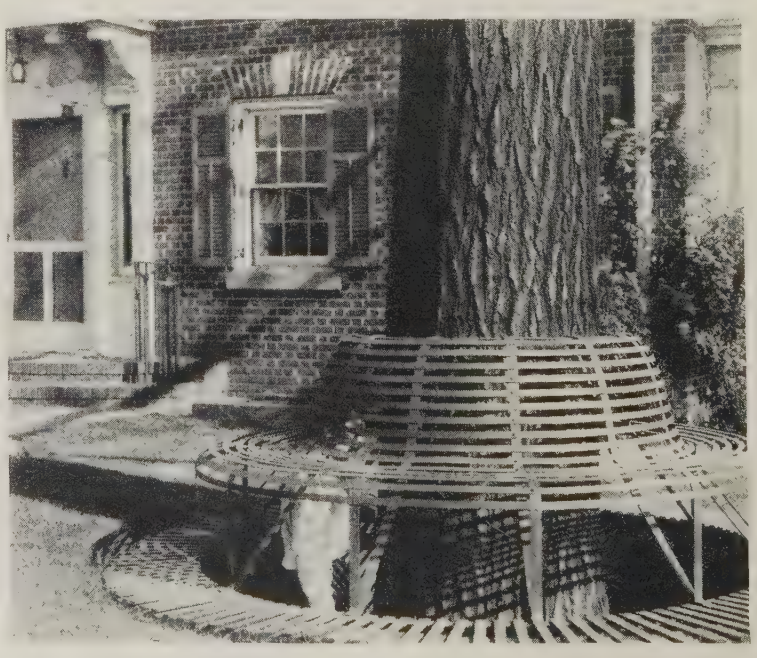
by Hon. Martin L. Davey

Photographs by Davey Tree Expert Co.

One of the most active workers in the House of Representatives in the interests of forestry and reforestation has been Martin L. Davey, Congressman from Ohio. He has been a useful and constructive ally to this cause. President of the Davey Tree Expert Company, his affection extends to all trees.

ALMOST a half century has passed since John Davey wrote and published *The Tree Doctor*. In those decades the appreciation of mankind for its trees has marched forward, and with it has marched the science of tree surgery,—the profession of administering to ailing trees that their shade and sheltering branches may be preserved. John Davey's book was based upon the primary fact that trees are living, breathing organisms, and are just as much alive as humans. They breathe, they have a circulation of life-giving sap, they digest food, they have sexual processes; and they have that Divine power to adapt themselves to environment and to fight for their existence.

Let's take a look at tree surgery from another standpoint. The man or woman who owns a good automobile usually prizes it rather highly and gives to it the best of care so that it may long continue to give satisfactory and efficient service. Should a "knock" develop in the motor he does not call in the town's handy man or the plumber to remedy the trouble, but immediately brings to his aid an expert automobile mechanic, preferably one who has had enough experience to be familiar with all the separate



Though the well was deep, the fill-in over the roots smothered the oak

Scientific remedies, however, such as soil-aeration, might save it

parts of the engine. Because of this expert knowledge the mechanic is usually able quickly to locate the trouble and to remedy it.

Tree owners have trees which are far more valuable to them than any automobile. Whenever these trees are subject to some trouble the owner desires to have them treated so that they may thrive instead of die. Contrary to an automobile, a tree lives. It is not man-made. It cannot be torn apart and put together again with new bolts, washers, piston rings, or other metal parts. Whoever acts as a surgeon to a living, breathing organism must know the habits, activities, and structure of that organism or the result is fatal. Real tree surgeons are acquainted with the principles which govern the normal, healthful existence of the patients they treat.

More than a quarter century's experience has shown that tree troubles arise from five major causes, namely, soil conditions, meteorological conditions, fungi, bacteria and some higher plants, insect attack, and mechanical injuries. Each of these major causes, for the purpose of correct diagnosis, may be divided and subdivided many times. But of what value is diagnosis if the surgeon does not know the proper remedy? If a tree is being attacked by insects the surgeon must know the life and habits of those insects before he can destroy them effectually. If fungus is causing the trouble it is necessary to know something about the particular fungus involved if the patient is to be cured. If soil conditions are to blame then what specific soil condition is at fault and how may the trouble be eliminated? And if decay is the main difficulty then what treatment should be applied?

SAVED!

Tree surgeons filled the cavity with cement, and callous growth covered the wound

Perhaps the trouble involves the tree's entire root system—which is so often the hidden cause of tree sickness—and therefore requires treatment which can in all propriety be called delicate. The all-important hair roots are largely contained within a circle, the circumference of which is located about under the edge of the branches. It is this myriad of hair roots that gather up the food in liquid form and send it upward through the body of the tree to the leaves. There is no more important study connected with tree surgery than the study of the root system and the methods to be employed when it becomes necessary to disturb this delicate network in order that disease may be conquered and the food supply of a tree may be augmented. It must be remembered that practically all trees growing on lawns and in parks are living under semi-artificial conditions and must be fed scientifically, preferably every year. The wages of neglect are death.

So, often, the science of tree surgery in the minds of many men and women is limited to the

NOT THE WESTERN FRONT

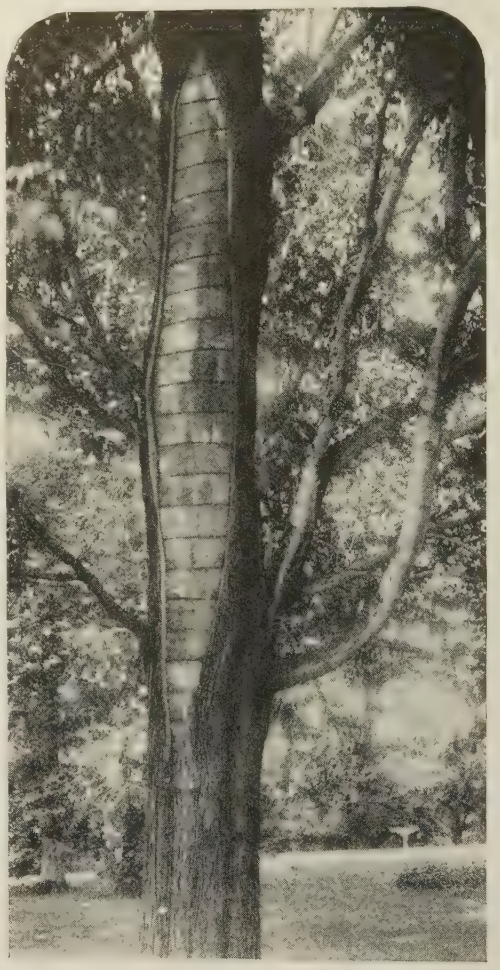
Just a courthouse yard, where neglect and ignorant beheading did their work

treatment of exposed decay and the resulting cavities. This is quite natural since it is the branch of tree surgery which is easily seen and recognized. Hence a word or two on this particular subject will not be out of place, especially if you are the owner of trees that are valuable from a shade or ornamental standpoint.

Nature has two principal manifestations, construction and destruction, more commonly described as life and death. In the vegetable world fungi and bacteria are the main agencies of destruction. Tree surgeons are called upon to combat these destructive agencies insofar as they attack the plants which it is their particular service to protect.

A tree is secure from attack by fungous spores only as long as its protecting armor is unbroken. Let any wound or break in the bark occur and the tree is immediately exposed to the attack of spores of the fungi and bacteria, which may be compared to the germs of human diseases. Whatever may be the cause of the breaking of the protecting armor it is followed by attacks of destructive agencies of the heartwood whose chief function is to support the tree similarly to the manner in which bones support the human body.

Since its cells are thickened and are no longer active in carrying food up and down, the heartwood naturally falls easy prey to destructive agencies, especially those fungi which cause decay. Unless given aid by the hand of man the tree in time becomes a hollow shell and its total destruction depends entirely upon the whim of the wind and storm. It is likely to crash to earth in the first strong gale.



GROWING AGAIN

The sectional fillings give structural strength, and are water- and decay-proof

The average person thinks of diseased wood as "rot" and does not realize that what is causing this rot is a host of microscopic, living plants. All of this diseased wood must be removed from the patient. Not one tiny speck must be left in the cavity. The cavity must be properly disinfected and then carved in such a manner that it will hold the filling which is later to be installed. The most exacting part of carving the cavity involves the proper handling of the cambium and sapwood at the edges of the opening. For after the filling is completed a qualified tree surgeon will not be satisfied unless the tree itself completely grows new bark armor over the entire cavity, thus protecting its health and beauty.

The main objects to be achieved in cavity treatments are to arrest all further progress of decay; replace so far as humanly possible the mechanical support which has been destroyed by the decay; to establish a surface over which healing may occur so that the filling may become an integral part of the tree, sealed into position and eventually covered by the growing callus; and to exclude moisture, borers and further infection from the spores of fungi which are everywhere present in the air.

During the half century since John Davey first began to practice the science of tree surgery no filling material has ever been found that equals Portland cement fillings, installed sectionally, and reinforced and integrally locked to the tree with bracing rods. Many substitute fillers have been tried and found wanting. Organic materials such as cork and wood are subject to decay and disintegration. Inorganic fillers installed in a monolithic mass crack and drop out. Still others contain chemicals definitely injurious to the tender cambium and callus. So-called open cavities have been found wanting because they do not replace structural strength and a healing surface, and because they do not prevent reinfection.

When Nature gave us our backbones she did not make them of jelly-like substance, but of hard bones, separated and protected from each other by cartilage, and articulating on each other in such a manner that they provide strength and yet yield to the twisting and bending of our bodies. In a large measure this is what sectional cement fillings accomplish in tree cavities. They are strong, flexible, durable, provide a proper healing surface and are inexpensive in initial cost and in cost of installation. None but small and simple cases of tree surgery would be possible were reinforced sectional cement fillings unknown.

If tree owners will always bear in mind that a tree lives a real life, and that under normal conditions it will grow, develop, and reproduce its kind, the distinctly scientific profession of tree surgery will be the cause of preserving America's priceless heritage of shade and ornamental trees until Nature herself gathers her plant children once more to her breast, to make room for others.

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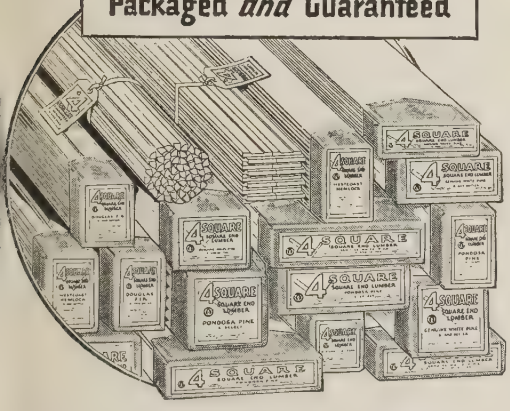

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DEPARTMENT *of*

NATURE EDUCATION

Dr. E. Laurence Palmer

Cornell University, Director

A New Nature Education Project

by E. Laurence Palmer

THOSE who have been habitual readers of this page will have noticed that its nature has varied greatly during the time it has been a regular part of Nature Magazine. For a time, it was designed to interpret for teachers' use the material in the other parts of the magazine. At another time, it was concerned largely with news of interest to those identified with Nature work professionally. At an earlier time, it was devoted to contributions by Mrs. Comstock and others who have been prominently identified with the development of Nature Education work. For a little over a year, it has been of a more or less editorial character concerned essentially with the problems of those identified with interesting others in Nature for one purpose or another.

About the 25th of September the October issue of the Nature and Science Education Review *will be available for distribution. Those interested in obtaining a copy of the initial issue are invited to make application for a copy to* Nature and Science Education Review, *American Nature Association, 1214 16th Street, Washington, D.C.*

There has been evidence that the single page has not been sufficient to satisfy the desires of our readers. One correspondent wrote of the July page that it was an "aggravation" since it had to be so short. It will be difficult to devote much more than the single page to material of this sort and for this reason the officers of The American Nature Association are lending their support to the establishment of a quarterly which will provide ample space for the publication of the type of material demanded by the members who regularly read this page. This quarterly will be known as *The Nature and Science Education Review.* It is hoped that the first number will appear in October.

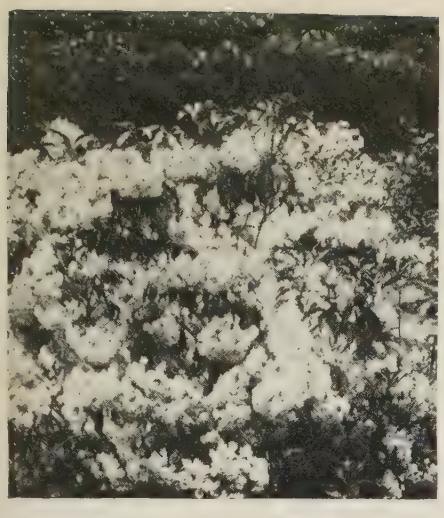
The support given the new periodical will naturally determine its permanence. The American Nature Association is willing to assure the publication of the initial numbers.

There seems to be no existing periodical which meets the needs that the publication will satisfy. *The General Science Quarterly, School Science and Mathematics* and *The Science Classroom* cover either more limited fields or more general fields than will probably be covered by the new journal. *The Nature Study Review,* which suspended publication a few years ago, did not exactly cover the proposed new field. It attempted to provide material such as now occupies most of the space in Nature Magazine and in addition to provide professional guidance and inspiration for the use of that material. In addition, it afforded a medium for the publication of research papers in the field of Nature Education or abstracts of those papers. It is proposed that the new *Nature and Science Education Review* assume those professional obligations met by the *Nature Study Review* which are not already met by the majority of the material in Nature Magazine. In addition, it will broaden its field of endeavor to include not only what is ordinarily considered as Nature Education but what some now prefer to call Science Education.

It is hoped that the new magazine will do much to prevent misunderstandings which might arise between workers in the various departments of Nature Education and Science Education. Those who have been concerned with the problems of teaching science in secondary schools have for years rebelled, with reason, against the colleges setting standards of content and method which must be met in the secondary schools. There seems to be some evidence that some of those who have won independence for science work in the secondary field are now assuming authority and setting standards which are to be met in the elementary field. It is only by the exchange of ideas between workers in such groups as these that the problems common to them may be worked out harmoniously. The new quarterly proposes to attempt to do this.

Besides the two groups of workers suggested in the preceding paragraph, others will be kept in mind by those responsible for the selection of material for publication. Prominent among these will be those interested in phases of Nature Education and Science Education which is not as yet generally considered a part of the ordinary school program. Leaders of this group resent

(*Continued on page 200*)



Finest Lot Ever!

IT'S my business to grow plants and sell them but sometimes I am tempted to hold on to whole acres of specific plants myself. There are growing in my Nursery this Fall some of the finest blocks of Rhododendrons, Azaleas and Kalmias to be found anywhere.

Rhododendron carolinianum

is one of the most beautiful of this charming class of plants. Large clusters of pale rosy pink during early May and equally suitable for sunny or partially shady situations.

	each	10	100
9-12 in. clumps	$2.00	$17.50	$150.00
12-15 in. clumps	2.75	25.00	225.00
15-18 in. clumps	3.25	30.00	275.00
18-24 in. clumps	4.00	37.50	

Kalmia latifolia

Our native Mountain Laurel pictured above continues to win new friends faster than we can provide plants. June flowering, it dominates the garden with its rosy pink or white flowers while the glossy foliage is attractive the year around.

	each	10	100
12-15 in. clumps	$1.20	$10.00	$ 90.00
15-18 in. clumps	1.60	15.00	125.00
18-24 in. clumps	2.50	22.50	200.00

Azalea calendulacea

The brilliant orange-yellow or flame-red flowers shine clear across the distant spaces. Here indeed is a native gem which for brilliancy and constancy has no equal. Blooms from early May until middle of June. A pardonable American slang expression aptly describes this species—it's a "knockout".

	each	10	100
1-1½ ft.	$2.50	$20.00	$175.00
1½-2 ft.	3.00	25.00	225.00
2-2½ ft.	3.60	33.00	

Prices quoted above stand for symmetrical stock, lifted with ball of earth, carefully balled with burlap and securely packed for safe arrival anywhere.

My complete catalog gladly mailed free to all interested in the naturalistic type of gardening. It abounds with offers of Ferns, Wildflowers, Hardy Perennials, as well as Rhododendrons, Kalmias, Azaleas, etc., all suitable for Fall planting. Please ask for it and mention Nature Magazine.

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Edward Forbush Retires

A fitting tribute was recently paid to Edward Howe Forbush, since 1908 ornithologist of the State of Massachusetts and long recognized as a peer in his profession, when a distinguished group of friends held a dinner in his honor in Boston to celebrate both his retirement and his seventieth birthday. Mr. Forbush still plans to continue his writing and research, however. Mr. Forbush has already received a gold medal "for outstanding achievement" from the state he served twenty years, and recently the Boston Society printed a special number of its proceedings entitled "Edward Howe Forbush, A Biographical Sketch", by John B. May.

Nature Poem Contest

The Annual Nature Poem Contest for 1928 will close November 1, the Chattanooga Writers' Club, Chattanooga, Tennessee, sponsors of the contest, announce. The prizes are $20 for first and $10 for second, and are donated from the Elberta Clark Walker Memorial Fund, established by Robert Sparks Walker, naturalist and author, in memory of his wife. The Chattanooga Writers' Club will readily forward details of the competition.

Humane Traps

More than $1400 will be given to the inventor who can build for the Royal Society for the Prevention of Cruelty of Animals, in London, a humane rabbit trap, which will avoid the painful maiming of the animals characteristic of the present steel trap. Captain E. G. Fairholme, chief secretary, announces that the competition will close November 1, 1928. The winning design must be cheap, portable, safe and easy to use, and must kill the trapped animal outright at once. It also must be small enough to be placed in the holes of rabbit warrens.

Phoebe's Multiple Nest-Building

Dr. Hyla S. Watters, now attached to the Wuhu General Hospital of Anhwei, China, writes thus of a phoebe's nest-building.

"The article in a recent number with regard to the multiple nest built by some phoebe birds, reminded me of a rather similar thing that happened a few years ago in our camp in the Adirondacks. A family of phoebes tried to establish a home on the beam supporting the rafters of our porch roof. But they evidently could not remember which rafter they had chosen for a landmark, for they brought building material to a number of different places, until there were nests or portions of nests beside eight rafters on the back porch and four on the front porch. Evidently the birds knew right from left, for all the nests were at the left side of the rafter, though this was north for the back porch and south for the front. No two eggs were in the same nest, and the birds sat sometimes on one and sometimes on another. Sometimes when the mother bird was sitting on a nest the father bird would come back to another and be ob-

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6 Ostrich, 4 Sensitive
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Suitable for moist, shady or sunny situations. (Please specify.)

FERNDALE FALL PEONY BARGAINS

Festiva Maxima, white flecked crimson; Edules Superba, mauve pink, early; Rubra Superba, deep rose, late; Duchess De Verneville, early white; Floral Treasure, clear pink.

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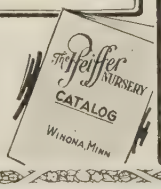

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SEPTEMBER is a good time for setting out rock plants. Warm days and cool nights are just what they like.

If you haven't a rock garden, make it now, so it will be a thing of beauty next spring.

Our catalog gives you all the necessary help hints. Also tells about the Dutch Bulbs and the wild bulbs for naturalizing, that everybody is so keen about these days.

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DELPHINIUMS with their tall (6-8 ft.) stately spikes of blue flowers, are the finest blue perennial in existence. Fine for background, in groups or as single specimens: I grow the famous Wrexham and Vanderbilt strains which come in various shades of blue, many having beautiful pink and lavender shadings. Also Toole's white, which is as good as the others, and pure white. There is nothing better to be had than these strains.

Fine 1 yr. plants, $4. per doz.; Selected plants, $6. per doz. All Prepaid. Send for Circular

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viously distressed at not finding her; then he would fly down to the porch rail to ponder a while and try again, finally arriving with great joy at the nest where she happened to be sitting. We used to wonder how he explained the fact that she would be absent one minute and present when he flew up a minute later; we doubted if he knew that there was more than one nest".

Predatory Birds and Game

BY EDWARD A. PREBLE

Close students of hawks and owls have long insisted that the effect of these birds on game was not altogether destructive. Additional proof in support of this view appears in *Nature* (London) for October 15, 1927, pp. 567-568, in a review of a memoir on coccidiosis in the willow grouse *(Lagopus lagopus)* by Prof. August Brinkmann. The memoir forms Communication No. 16 of a comprehensive investigation of the biology of the grouse undertaken by the Bergen Shooting and Fishing Society. We quote from the review:

"In the fluctuations in the stock of willow grouse until the 'nineties, the intervals between the good years were of fairly short duration—a few years only—but the last bad period has extended from the year 1912-13 to the year 1925-26, which suggests that some new factor is exerting an influence. Prof. Brinkmann considers this new factor to be the heavy toll which has been taken of the Norwegian birds of prey. He regards as proved that birds of prey have a favourable effect on the stock of birds, as they take more of the sick than of the healthy birds. One result of the decimation of birds of prey was an enormous increase in the stock of willow grouse which culminated in 1911. But as no attempt was made to preserve the stock by having gamekeepers to collect sick and dead game and to cleanse infected areas by burning the heather—which would have been impossible under Norwegian conditions—the result was a complete collapse of the stock. This was due to a violent epizootic (coccidiosis) which, because the coveys lay very close together in the summer, had exceptionally favourable conditions for development. The epizootic has continued year after year, and it was not checked until the stock had become much reduced. The coveys then lay so far apart during the breeding season that the risk of infection was considerably diminished.

"Coccidiosis appears to be endemic almost wherever grouse are found; Prof. Brinkmann states he has proved its occurrence in Iceland and Spitsbergen. Verwey's view that coccidiosis in different kinds of birds is due to a series of phenotypes of the same parasite, *Eimeria avium*, which can be transferred from one species of bird to another, is in accord with the Norwegian observations that there was coccidiosis simultaneously among willow grouse, ptarmigan, black game, and capercaillzie, and that at the time when the epizootic was at its height the small birds also disappeared in various places. On these grounds, Prof. Brinkmann concludes that it would be impossible to exterminate *Eimeria avium*. He recommends less destruction of the birds of prey so as to endeavour to return to the conditions before the 'nineties, when, though there were fluctuations in the stock of willow grouse as great as they are now, the bad periods were of shorter duration".

Shall we, in our treatment of our wild life, avail ourselves of scientific research, or shall we continue in our senseless course of destroying as "vermin" all flesh-eating birds, in the belief that we are thereby practicing conservation?

Radium and Heredity

Following up the generally accepted thesis that radium affects heredity, and utilizing discoveries of varying amounts of radium in the earth in different parts of the world, Dr. Charles S. Piggot, of the Geophysical Laboratory of the Carnegie Institution of Washington, proposes to make a world-wide survey of the radium contained in important kinds of rock, to discover what effects this substance has had on rates of evolution. Dr. Piggot recently discovered that there are several ounces of radium in Stone Mountain, Georgia, on whose side figures of Lee and other Confederate officers are being carved.

Hunting Meteors

Three Texas members of the American Meteor Society, J. H. Logan, O. E. Monnig and S. Bunch, have been enjoying their evenings as well as helping the cause of science by simultaneously observing falling meteors from different places. With watches set to coincide, and similar sections of sky designated, they each fixed the trails of eight meteors by comparison with immovable stars and then worked out by triangulation the path and the height above the ground of these visitors. The American Meteor Society would welcome other groups of volunteer observers doing the same thing.

San Jacinto Park

The Outdoor Nature Club of Houston, Texas, recently opened San Jacinto River Park, a two hundred acre area abounding in wild life and native flora, which was given them by Harry K. Johnson, local traction controller, as a game preserve and Nature sanctuary. The preserve contains as specialties cypress, oak, magnolia, sweet gums and paper birch, two jewel-like lakes, an abundance of chattering jays and blue herons and other birds, and many raccoons and alligators.

Many Hunters

More than five million hunters, 600,000 more than in the previous year, stalked their prey during the season 1926-27, and brought nearly eight million dollars into the coffers of the several states, the Bureau of Biological Survey of the Department of Agriculture announces. New York State, with 620,000 licenses, led the others in supplying hunters. If this rate keeps up, Nature is going to have difficulties in supplying them all with suitable "bags". As the situation now stands, there are twenty-seven hunters to each woodcock, and in one state at least, 10% of the deer are shot off annually.

Waddington Nature

A. B. Brooks, naturalist and author of several *Nature Magazine* articles, has been made director of Nature education at Waddington School, Wheeling, West Virginia, for the summer, officials announce, and a program of hikes, nature classes, field work, and Nature labelling is under way. Chief

Gorgeous Springtime Blooms

SHUMWAY'S "Pedigreed" Bulbs

If you want a beautiful springtime garden, plant bulbs this fall. Shumway's "Pedigreed" Bulbs are imported direct from Holland; guaranteed largest sizes, first quality. You can't fail to produce tulips of gorgeous beauty. Make your selections today at our new low prices. Delivery charges prepaid.

Superfine Mixture—Largest Size Bulbs

100 Darwin Tulips	17 Varieties	$ 2.95
100 Breeder Tulips	15 "	3.50
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100 Early Single Tulips	12 "	3.25
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100 Parrot Tulips	5 "	3.00
100 Crocus (1½" dia.)	5 "	2.50
100 Hyacinths	10 "	13.75
100 Crocus (1¾"—2" dia.)	5 "	3.75
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Mons. Jules Elie. Glossy lilac-pink, shading to deeper rose at the base, the entire flower overlaid with a sheen of silver that shimmers in the sunlight .....**.50 each**
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Candidissima. Guards creamy white; center sulphur-yellow, delicately tinted flesh, with a light green heart; very chaste and refined. True honey fragrance .....**.50 each**

The Old Garden Collection of Peonies if ordered singly would cost you $4.00. We will send you these eight splendid roots prepaid for $3.00. With every order for an Old Garden Collection we will include a Mons. Courant free.

The Superb Collection

Mlle. Desbuisson. Color tender, glossy pink; center waxy white; guards violet-rose.....**.60 each**
Berlioz. Bright current-red, center tinted rose and shaded amaranth .....**.60 each**
Jeanne d'Arc. Soft pink, intermingled with sulphur-white and rose; center spotted carmine .....**.60 each**
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Queen Victoria. A good every-day white ....**.60 each**
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Livingstone. Pale lilac-rose, with sheen of silver. .....**.75 each**
Dorchester. A delicate hydrangea-pink or salmon-pink, a color that is very rare in Peonies....**.75 each**
La Tulipe. A delicate blush-white, shading to ivory-white, with red tulip markings on outside of guard petals. .....**.75 each**
Augustin d'Hour. Color very deep, rich, brilliant solferino-red with slight silvery reflex.....**.75 each**
Triomphe de l'Exposition de Lille. The large, compact blooms are a fresh hydrangea-pink, splashed with darker tints of violet-rose, and have a white reflex; guard petals become nearly white ....**.75 each**
Solfatare. Guard petals snow-white; center sulphur-yellow, changing as the flower ages to pure white. All the petals are wide.....**.75 each**

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It's a book well worth getting and having for reference. Chapters on how to enjoy Peonies for a whole month, how to judge the comparative merit of varieties, who is who among the best and the good points in favor of the rest—these are just a few of the topics covered in this, perhaps the most exhaustive treatise devoted to Peonies exclusively. Your copy is waiting for your call. Please ask for it and mention Nature Magazine.

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of the features of the summer work is the establishment of out-door museums along Nature trails.

Antelope Pictures Used

The motion pictures of pronghorns or American antelopes, taken on the Pack-Finley expedition into southeastern Oregon, have proved of unique value as natural history records. These studies have been used by the Carnegie Museum at Pittsburgh in making up a large habitat group of these unique animals.

A year or so ago the field naturalists of the Museum secured a permit to take some antelopes in southeastern Oregon for this life group. Several specimens were taken from among the herd which Mr. Finley photographed last summer. It was decided to mount the animals running at full speed, but even though the artist had watched these racers of the desert, the action was so fast that only the eye of the camera could register the exact position of head, body and feet at any specific moment. The taxidermists had searched everywhere for accurate life positions of racing antelope, but the models constructed seemed faulty.

When Mr. Finley lectured in Pittsburgh and the Museum men saw these slow motion pictures of speeding antelope, they were exactly what the artist needed. Sketches were made from the individual pictures of the film, so the antelope group when complete will be minutely accurate in showing the life of this speediest wild animal on the continent.

Barn Owls Help

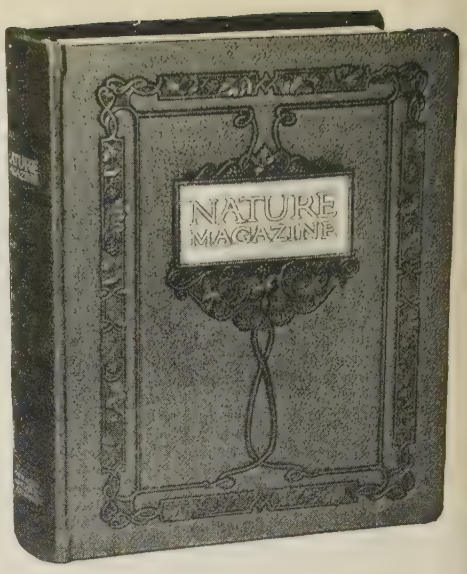
Howard G. Taylor, of Riverton, N. J., writes in connection with barn owls, the subject of a recent article in *Nature Magazine* by Mrs. Mabel Gillespie, that these creatures, he has found are economically valuable to man. Two adult owls, named Castor and Pollux, raised four broods of youngsters near his home, and every day the remains of rats and meadow mice were found under the nest. The owls, during their sojourn, eliminated numerous generations of rats who lived on the banks of a neighboring river and caused considerable damage. Only once did they bother chickens, and while at this time they created great confusion, it was never proved that any fowl were taken.

Testing Seeds

Rules for properly testing seeds for purity and germination qualities are contained in Department Circular 406-C, issued by the Department of Agriculture, which is available at the Department in Washington, D. C. While quite technical and designed for Federal and State seed analysts, it is also useful to professional seed-growers.

Humane Traps

In response to a wide spread and insistent demand on the part of the Nature-loving public, including the humane societies of the country, the National Association of the Fur Industry has offered an annual sum of $150.00 to be distributed as first, second and third prizes, to the inventors producing traps which show the greatest progress in the direction of practicability and humaneness. The winners of the annual contest are eligible to compete for the final prize of $10,000,



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also offered by the National Association of the Fur Industry, for a trap which shall displace the widely used steel trap which is opposed because of the cruelty involved in its use. Needless to say, the requirements as to size, weight, cost and other features are quite rigid.

The first award of the annual prizes was made at Albany, New York, on May 29, 1928, at the offices of the American Humane Association, which is co-operating with the Fur Association in the matter. The persons asked to act as judges were Edward A. Preble, Consulting Naturalist of the American Nature Association, J. J. Slautterback, Chief of Vermin Control of the Pennsylvania State Board of Game Commissioners, and Dr. S. C. Bishop, Zoologist of the New York State Museum. The latter was asked to act for the National Association of the Fur Industry, that organization having failed to send a representative.

More than a hundred styles of traps, mostly represented by actual working models, were reviewed by the judges. The first prize winner had devised a plan by which the common steel trap can be prevented from breaking bones and lacerating the flesh; the second prize was awarded to the maker of an improved type of box trap that takes animals alive; while the third prize was for a trap designed to kill its victim instantly.

It was felt by the judges, who were selected because of practical knowledge of traps and trapping, that a creditable start has been made in the matter of providing for less suffering in the taking of wild animals.

National Forest Animals

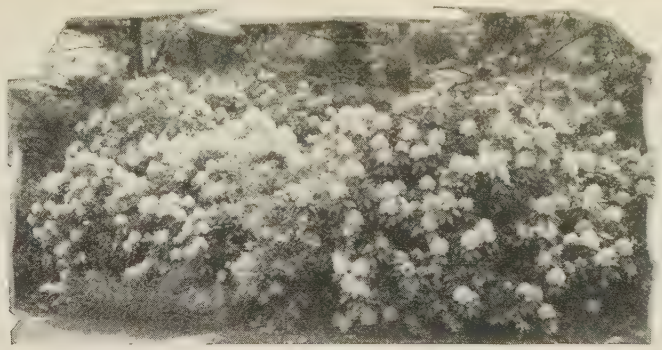
In the 160 National Forests of the United States, antelope, black and brown bears, deer, elk, mountain goats and sheep and beaver have been increasing in numbers, while ground-nesting birds, grizzly bear, and moose are losing ground, Will Barnes, formerly assistant forester of the Forest Service of the Department of Agriculture reports following the annual census. Deer have prospered remarkably, despite liberal open seasons. In amount of game, the western forests far surpass the eastern ones, the summary indicates.

Colorado Forests

Colorado National forests, vast enough to grow each year timber for the whole state, and covering thirteen million acres, are described in Miscellaneous Publication No. 18-M, *"National Forests of Colorado"*, published by the Department of Agriculture. The resources, principal activities and recreational facilities of each of these fifteen forests are described, and a survey of the methods of managing and maintaining these timber resources is included. The bulletin may be obtained from the District Forester, Forester Service, Denver, Colorado.

A Bird Jonah

On the day that Berea College opened, last fall, a large black snake celebrated by swallowing a jaybird, while the student procession, wending their way to chapel, watched the festivity. The jay, according to John Smith, who reported the incident, did not like the situation, and made a fuss. The snake grew uneasy; he writhed, he trembled, and with a final contortion or two, the jay came forth to light once more. He



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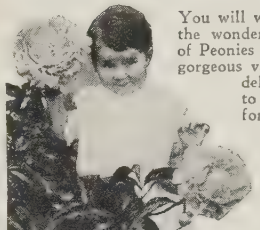

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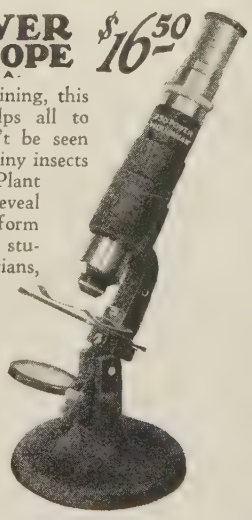

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was wobbly and uncertain, and unable to fly. He looked as if he had been baptized in hot grease as he staggered over the campus trying to find grasshoppers. With each grasshopper he caught, however, he grew more hopeful, and finally made his way aloft. As for the snake,—he had gone into retirement, to think the situation over.

Popular Science

To many scientific men of the past, popular science was classed with nature faking, but in recent days scientific men themselves have come to consider the need of helping the government-controlling people to understand the lines of development which they are casting about the universe. For too long a period has the man of true science kept his light under a bushel, while politicians, financiers and business men took all the credit for progress. The English publication *"Nature"*, whose high standing is well known, aptly and deftly discusses the new situation. It says: "There is no valid reason why the dissemination of knowledge beyond the confines of schools and colleges, provided it is carried out with honesty and dignity, should not be acknowledged to be as valuable a social service as the collection and arrangement of the knowledge itself. . . . Could one, for example, imagine an unenlightened community establishing a Ministry of Health, or a Department of Scientific and Industrial Research? . . . It is clear enough that the business of men of science is to help guide mankind as well as to serve it". The publication goes on to point out that in England "we lack a widespread sense of the importance of an appeal to the non-specialist members of the community as a part of their ordinary daily culture", and mentions as a worth while American example the organization known as Science Service, directed by Dr. E. E. Slosson of Washington, under the auspices of the National Academy of Sciences, the National Research Council and the American Association for the Advancement of Science, which publishes science news bulletins and summarizes weekly scientific progress in terms the layman can understand. We agree heartily with the tone of the editorial, and see in the spread of popular science and knowledge a cultural uplift of the United States, which long has borne and to some extent deserved the taunts of Europe. When such books as Slosson's "Creative Chemistry", Durant's "Story of Philosophy". Wells' "History", scientifically accurate works on natural history, astronomy, biology and similar subjects are being constantly read by steadily growing masses of people, it is safe to say that the United States is entering a new era of enlightenment.

Young Folks' Conservation

A state-wide organization, with no dues and no exacting requirements, aims to embrace in its personnel the boys and girls of Georgia. Its name, "The Loyal Legion of Nature Guardians", outlines its purpose. It is sponsored by Peter S. Twitty, head of the Georgia State Board of Game and Fish. Each of our states might well organize similar associations. Among the 25 suggestions that the members are asked to adopt as a part of their creed we select the following as representative:

Members of the Loyal Legion of Nature

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Says:

"During our Arctic flight and on our journey afoot over the polar pack ice, I found your

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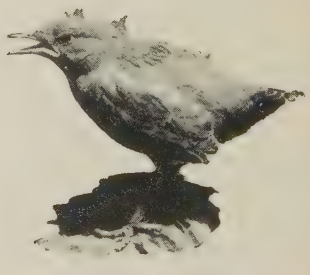

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Guardians are asked to form local clubs and study birds, animals, trees and flowers.

Attract birds to the home or farm by putting out food and water for them. Build bird houses and bird baths.

Discourage other boys from robbing birds' nests, or shooting song birds with airguns or slingshots.

Discourage the caging of song birds as pets. Birds and animals love their freedom as much as humans do.

Encourage the establishment of bird sanctuaries in your own communities.

Know the valuable fur-bearing animals and protect them from wanton destruction.

Wood fires and unnecessary burning of underbrush and hedges destroy thousands of birds, nests, fur-bearing animals and other forms of wild life each year.

Study trees and learn to identify them by their size, leaves, bark and wood.

Discourage your friends in the practice of wastefully destroying wild flowers.

Do not fish during the spawning season. One fish caught during spawning season may mean the destruction of a million eggs.

Ask your teacher to explain to your class about the Loyal Legion of Nature Guardians, if she has not already done so.

Prehistoric Oysters

The thick bed of oyster shells which has been found on the banks of the lower Potomac near Cornfield Harbor, Maryland, were laid down with mud and sand during the Pleistocene period some million years ago, when the sea covered the land, and was warmer than now, according to W. C. Mansfield of the Department of the Interior. Cypress stumps buried nearly ten feet beneath twenty-two foot heaps of shells have been found. And indications are that they are one hundred thousand years old.

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Nature Education

(Continued from page 192)

the classification of their work as being extra-curricular on the grounds that they feel, possibly with justice, that the time will come when school curricula generally will include such Nature and Science Education work as is now handled under the leadership and responsibility of the scouting and camping organizations.

Other groups whose interests will be kept in mind will be those concerned with school gardening, with humane education, and those interested in Nature work in connection with playground and recreation programs. Besides these, there are the groups identified with the training of leaders for work in or outside the school organization. Announcements of meetings which will be of interest to all of these workers will appear when this information is supplied in time for publication. Abstracts of the papers presented or the papers themselves will be published where space permits. It may be possible to publish information concerned with research projects which are under way and which may be of interest to the readers of the Review.

It is planned that there will be a section devoted to review of papers published in other periodicals and of books which may be of interest to educators engaged in solving Nature and Science teaching problems. In addition, there will be a section giving suggestions for the use of current Nature Magazine articles by the groups which will be served by the new publication. There is ample material available for publication to guarantee the quality of that which will be published. The cooperation of all is asked in making the new periodical a success.

Anti-Rodeo Petition

In an attempt to raise legal bars against rodeos because of alleged cruelties to horses and steers, the California Anti-Rodeo-Cruelty Association, from Berkeley, is circulating a petition to bring public attention to a focus. It already has the support of the National Congress of Parents and Teachers, and of humane societies over all the country, and has collected a formidable array of evidence to prove its case.

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A Life in the Woods

With such a delightful book to review as *Bambi* by Felix Salten there seems no reason for starting with a review of the brief foreword contributed by John Galsworthy. Nevertheless there are two points made by Mr. Galsworthy which constitute a sort of text. He says that "*Bambi* is a delicious book. For delicacy of perception and essential truth I hardly know any story of animals that can stand beside this life study of a forest deer". We agree with him unreservedly. He also professes a dislike, generally speaking, for books which attempt to place human words in the mouths of dumb creatures, but finds in *Bambi* the exception which amply substantiates his usual disapproval of this sort of thing. With this we agree also. Kipling and perhaps one or two others have succeeded in doing this type of writing. The many who have tried it have failed miserably. Felix Salten joins the ranks of the few.

Bambi is a deer and we live with him a life in the wild from spotted fawnhood to antlered parenthood. We meet many other wild creatures and listen to their conversations,—conversations of ineffable beauty and simplicity, of sound and delightful philosophy. The adult will find that *Bambi* can be read in three different ways. It can be read for the vast meat of thought that is in it; it can be read for the joy and tear that is in it; it can be read to or by the youngsters for the great good and love that is in it. We are delighted to know that *Bambi* is the Book-of-the-Month Club choice for July because this means that it will be given considerable circulation. Simon and Schuster are the publishers and they have scored again.

But before we leave *Bambi* there is another point made by Mr. Galsworthy. He says, "I particularly recommend it to sportsmen". We hope that every sportsman and those who masquerade under this loose designation will read *Bambi*. It might do no few of them a lot of good.

R. W. W.

Simba and Others

The romance of the jungle animals has been caught up another time. Tambo the elephant, Mbogo the buffalo, Kifaru the rhinoceros and Twiger the giraffe have been portrayed once more as living, thinking, feeling creatures. This time the book is *African Jungle Life,* by Major A. Radclyffe Dugmore, and is published by Macmillan Company at $6. It is written not for the naturalist or the traveller, but for the Nature lover who wishes to catch from home some intimate glimpse of African life. The book, of course, has a chapter on Simba the lion. No book on Africa would be complete without a chapter on Simba.

Transplanted Birds

The Bureau of Biological Survey has just issued a bulletin entitled *Wild Birds Introduced or Transplanted in North America,*

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officially known as Technical Bulletin No. 61, of the U. S. Department of Agriculture, and prepared by John C. Phillips, cooperating with the bureau. It lists and discusses all of the varieties known to have been plucked from various parts of the globe, and deals thoroughly with the circumstances governing their introduction and the different kinds of responses they have made to new environment. This bulletin is available at 10 cents the copy, from the Superintendent of Documents.

"Oh, Ranger!"

Every one goes to the National Parks—dudes, sagebrushers, wits, seekers for knowledge, seekers for adventure, reckless souls yearning for the Great Beyond, morons. The rangers not only have to take care of them, bed them, pull them out of crevasses, keep them informed, tell them stories, guide them, and answer their questions, but they also have to protect the game from them, the flowers, the rocks,—and the parks. The saga of these busiest of mortals has been at last written by Horace M. Albright and Frank J. Taylor in *"Oh, Ranger!,"* and published by the Stanford University Press. It is more than merely funny, more than an up-to-date edition of Mark Twain's *Roughing It,* for besides the stories there is a composite picture of the National Parks, their history and that of the organization which made them possible, the Nature that is in them, the wild life that brings the tourists. It is dedicated to Stephen T. Mather, Director of the Park Service. When you read it, be sure and linger over the pen sketches. They are far from being the weak points of the volume.

Conservation Education in South

In the *Florida Naturalist* for July, 1928, is an excellent article by Herbert K. Job, Director of Nature and Conservation of the South Carolina Department of Education. In this he reviews the history of conservation activities in this state touching on the methods followed and the results achieved, and gives suggestions for the extension of the work into other parts of the south. We hope that the fullest possible response will be given to Job's laudable efforts in this much-needed work.

Another Dog Story

While *Jan, Son of Finn,* written by A. J. Dawson, does not inspire the enthusiasm that *Bob, Son of Battle* and the *Call of the Wild* did, while it verges on the edge of being just another dog story, yet any animal lover can readily become interested in it, and follow the adventures, loves, acts of heroism and tragedies of Jan, the dog half gray- and half blood-hound, without place-marks. Jan happens to be involved with the Northwest Mounted Police, always a source of interest. Though the story starts slowly with a drawn-out prologue before Jan is born at all, it quickens into a smooth running tale before the grand finale. E. P. Dutton and Company, New York, publish the book at $2.50.

Geology

Allan L. Benson, one time candidate for the office of President of the United States on a Socialist ticket, dropped his political writings to compose *The Story of Geology,*

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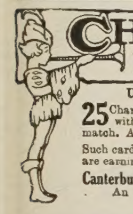

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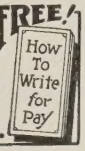

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a popularly toned, simply-told, rather complete tale of "the records of the rocks" that outlines the main theories and facts dealing with the formation and changes in the earth. Mr. Benson brings meteorology, palaeontology and anthropology to the aid of his composite picture, and his general survey is frankly an attempt to bring geology within the range of those who do not take "courses", or who have not the time or energy to unravel technical phrases. Cosmopolitan Book Corporation have brought it out.

Elements of Conservation

This is a book that has long been needed in our southern states, and it is gratifying to note that it is being used as a textbook in many schools. The history of waste that has accompanied the settlement of our country, and that seems to increase in volume even faster than our population, is told in no uncertain terms. Methods of correcting such abuses, as far as they can be corrected, are pointed out. There are more than twenty chapters, and in them are treated our soils, forests, insects, reptiles, birds, fish, plant life, health in man, and the destroyer—fire.

We have little but praise for this book, but we note that in several places our larger hawks and owls are treated as wholly harmful species, and that the use of pole traps, which catch indiscriminately both harmful and beneficial species of raptorial birds, as well as many of our smaller bird friends, is advocated. We trust that in future editions these blemishes in an otherwise excellent book will be removed.

Elements of Conservation, by Garrard Harris, is published by the Johnson Publishing Company, Richmond, Virginia, and costs one dollar.

Diseases in Captive Animals

Diseases in Captive Wild Animals and Birds, by Dr. Herbert Fox, is a work that may truly be termed unique, for the studies on which it is based are the first ever pursued in so thorough and systematic a manner. They began in 1901, and since that year nearly six thousand autopsies of mammals and birds that have died in the Philadelphia Zoological Garden have been made by Dr. Fox and his able assistants, Drs. Weidman and Corson-White, who are the authors of certain chapters. Practical results of these and correlated studies include the practical elimination of tuberculosis in monkeys, and certain other diseases; vast improvements in hygiene and disinfection have resulted; numerous data of value in future studies have been accumulated. Knowledge of anatomy has increased.

Wild animals are commonly thought of as invariably healthy, but the studies of Dr. Fox and his associates have revealed many instances of disease occurring in individuals or even communities of mammals and birds, fresh from the wild. On the other hand, captive wild animals, as do captive or restricted aborigines, exhibit a marked reduced resistance to infectious diseases.

The work is indispensable to those interested in collections of living animals, and all physicians will find it interesting from the analogies suggested to diseases of humans. J. B. Lippincott, Philadelphia, is the publisher.

E. A. P.

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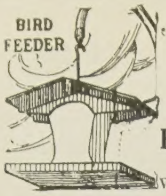

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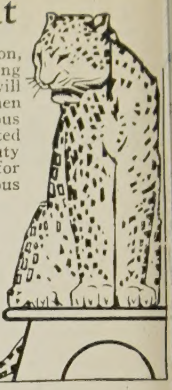

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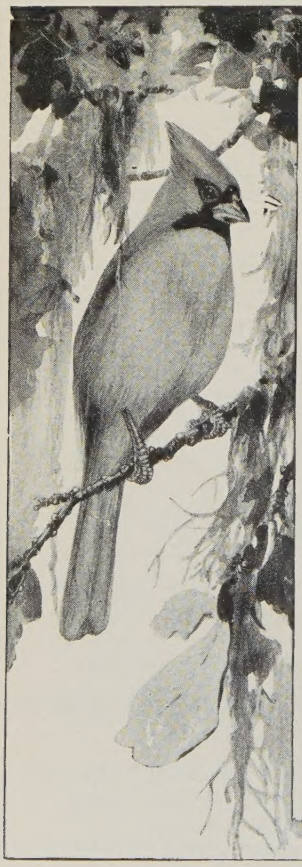

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The American Tree Association stands for a constructive policy of forest protection and extension, to increase appreciation of forests as natural resources essential to the sound economic future of the country.

The Association directs encouragement of tree planting by the public; disseminates popular forestry news for the information of editors of the daily press; and compiles and distributes forestry news and reports on legislative progress for assistance of active foresters in the field.

The American Tree Association

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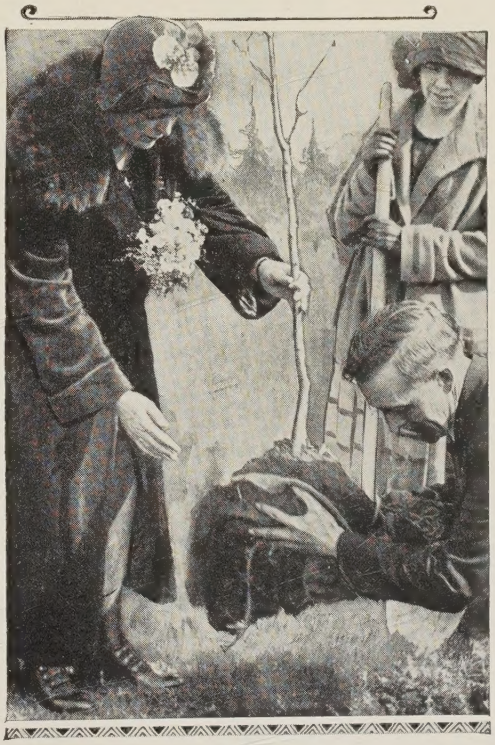
With the approach of the Fall season the tree-planting army will be in the field again. Coupled with this comes the opening of the schools when the reading of the Forestry Primer published by the American Tree Association will be resumed. It is well to co-relate the two projects and thus put in the mind the importance of tree planting as an introduction to the larger phases of reforestation. The tree planting book also published by the American Tree Association gives a list of Arbor Days in the various states. One phase is memorial tree planting particularly on Armistice Day. It may be one tree, a memorial avenue, a Road of Remembrance or a Memorial Forest. In some places the program extends over a period of years.

An elm tree every fifty feet from Youngstown, O. to Boardman within the next four years. A sugar maple or elm every fifty feet from Boardman to North Lima within the next eight years. An elm or maple every fifty feet from North Lima to East Liverpool on the Ohio River within the next fourteen years is the program of the Mahoning County Road of Remembrance sponsored by the Youngstown, Ohio, Federation of Women's Clubs. The Avenue from Youngstown to Boardman is to be a Road of Remembrance for Mahoning County World War men, who gave their lives. From Boardman to North Lima a Road of Remembrance for Mahoning County's enlisted heroes who offered their lives. From North Lima to the Ohio River for all Ohio Soldiers dead. Two hundred and thirty trees are planted now according to Mrs. G. I. Gardiner. A ceremony is planned for Armistic Day.



Planting the first oak to be given Seattle Parks by Veterans of Foreign Wars in commemoration of American heroes. Left—Mrs. Thomas Cameron and O. E. Scott, commander of Roosevelt Post No. 24, placing a memorial tree to Thomas Cameron in Woodland Park

Roosevelt Post No. 24, Veterans of Foreign Wars of Seattle has begun an annual tree planting. The first planting was twelve oaks. J. C. Dutton accepted them for the park board. Commander O. E. Scott dedicated the trees.

J. A. Littlefield of Farwell, Mich. has given ten acres of land to the school in the village of Clare for a forestry plantation. This land is to be planted to white ash, Norway pine, and Norway spruce for Christmas trees, with space reserved for other kinds of evergreens and trees of memory.

Reforestation of tracts in Denver's municipal park system was undertaken by 1,000 boys and girls. The activities, under the direction of the forestry committee of the Chamber of Commerce, include the planting of pine trees in the park of the Red Rocks near Morrison by 250 De Molay boys and a planting on Inspiration Point of Camp Fire Girls assisted by Boy Scouts.

Children of the Roosevelt school at Spokane, given the privilege of voting a name for the tree which the Spokane Floral Association planted on the school grounds named it Col. Charles Lindbergh. The association planted a mountain ash tree on the school grounds, following the annual custom of honoring some city school with a tree planting ceremony, Mrs. C. T. Goodsell is civic chairman for the association. The program was arranged by Miss Lena E. Witt, principal of the school.

Six silver maples were planted in Farnham Park by the Camden, N. J. Woman's Club as a memorial to six members. The ceremonies were conducted at the park by the President, Mrs. A. Haines Lippincott. At the park, Mrs. George W. Bradley was in charge of the program.

Dr. Ella Upham was honored by members of the Asbury Park Woman's Club, of which she is a charter member and ex-president, by the planting of a pin oak tree on the high school grounds. Dr. Fred Shepherd, former superintendent of the high school spoke.

The American Tree Association welcomes you to membership. The only way to join is to plant the tree and register it on the Association's National Honor roll. If you know of tree plantings be sure the Association is notified. The tree planting army is a growing one.

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